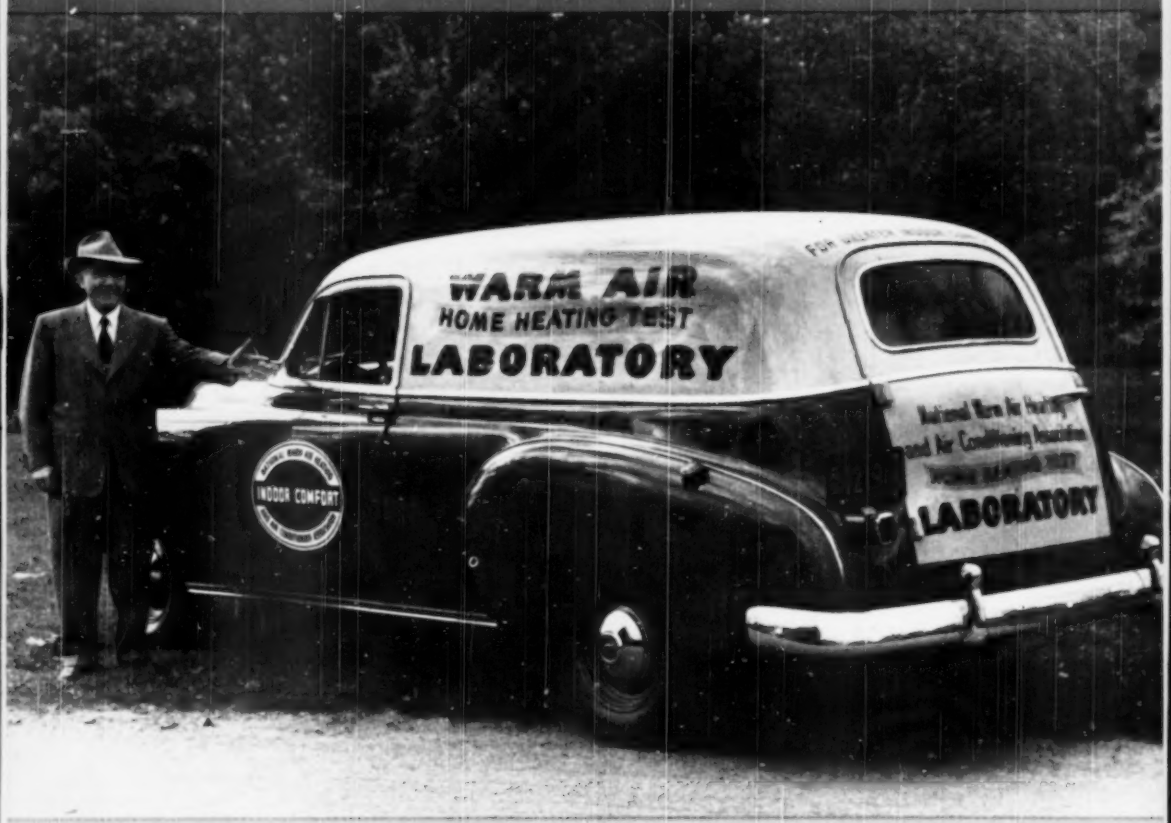
AMERICAN ARTISAN

DECEMBER 1950
87th Year

RESIDENTIAL AIR CONDITIONING • WARM AIR HEATING • SHEET METAL CONTRACTING



• W. D. Redrup, First Vice President and Chairman of the Installation Codes Committee, NWAH&ACA, introduces the new mobile laboratory of the association.

• Damages for Contract Delays can be a result of a short supply situation. Contractor liabilities are analyzed.

• Perimeter warm air heating systems can be adapted to various types of house construction. See Page 71.

• Proper use of color in the sheet metal shop can aid safety and improve employee efficiency measurably.

• A complete index of all the editorial articles published in American Artisan during 1950 begins on Page 108.

LOW-COST, DEPENDABLE RUST-RESISTANCE

... for all Types of Sheet Metal Work

You get it in TONCAN IRON—the sheet metal man's favorite for every installation in which rust may be a problem.

TONCAN is an *alloy* iron. Its basic ingredient is highly-refined open hearth iron. Copper is added—*twice as much* as in ordinary copper-bearing steels or irons. Then the correct amount of Molybdenum is alloyed to bring out the full effectiveness of this double dose of copper.

This high rust-resistance is no mere surface quality. It extends *all through* the iron. Fabrication does not lessen it. TONCAN IRON readily can be formed, punched, sheared, riveted, soldered, welded and otherwise worked—and still it fights rust.

How about cost? . . . only slightly higher than less rust-resistant materials when you figure the total labor-material-haulage costs of any job. For your customer, TONCAN IRON quickly becomes a real saving through its long years of rust-resisting service.

Like more information? Write *today* to:

REPUBLIC STEEL CORPORATION

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, N. Y.

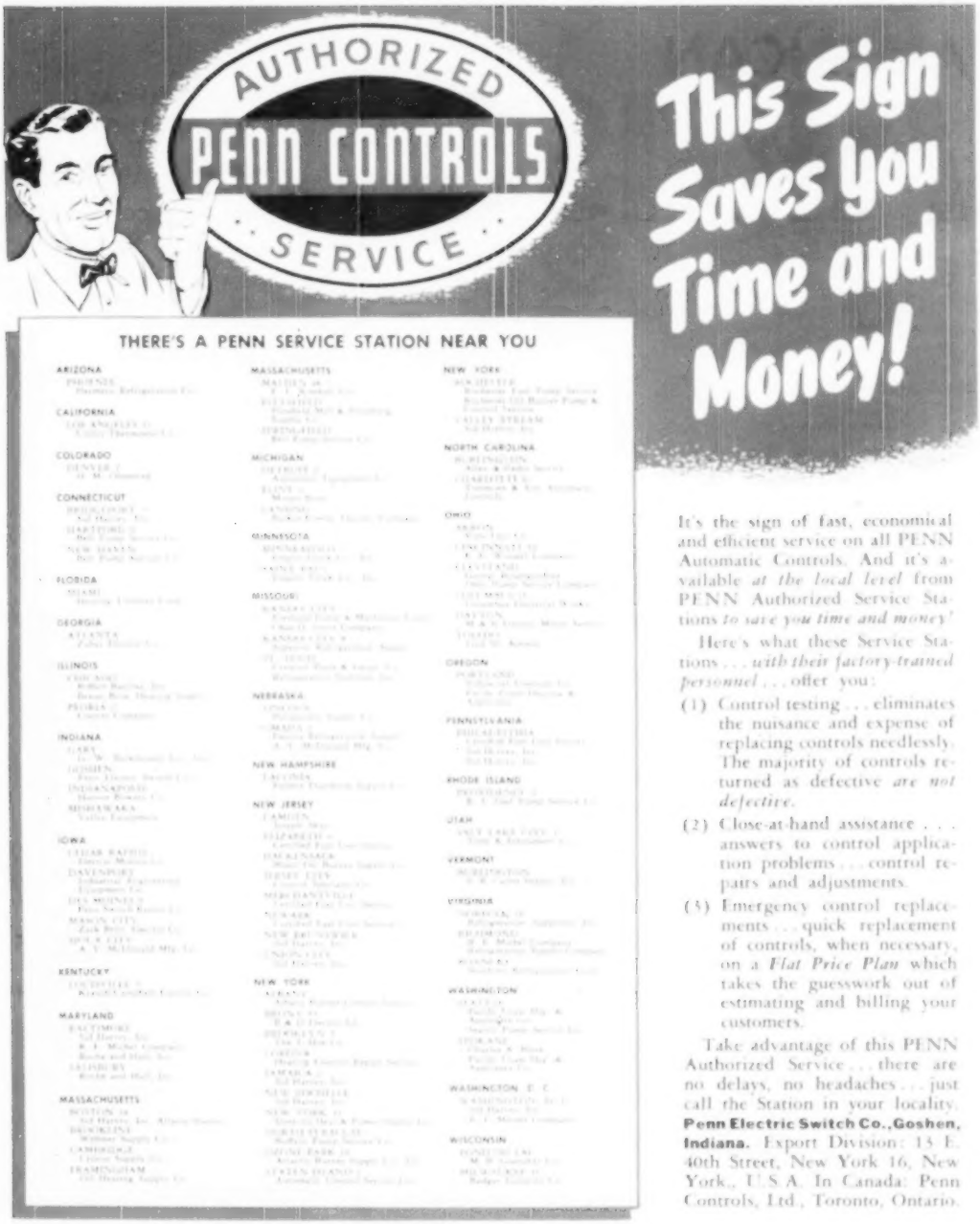
for 40 years . . . HIGHEST RUST-RESISTANCE OF ALL FERROUS MATERIALS IN ITS PRICE CLASS

Republic

REPUBLIC STEEL

TONCAN COPPER MOLYBDENUM **IRON**

—for decks, gutters, conductor pipes, roofing, siding, tanks, ventilators, skylights, hoods and other sheet metal applications requiring rust-resistance—and for corrugated metal drainage products.



It's the sign of fast, economical and efficient service on all PENN Automatic Controls. And it's available *at the local level* from PENN Authorized Service Stations *to save you time and money!*

Here's what these Service Stations . . . *with their factory-trained personnel* . . . offer you:

(1) Control testing . . . eliminates the nuisance and expense of replacing controls needlessly. The majority of controls returned as defective *are not defective.*

(2) Close-at-hand assistance . . . answers to control application problems . . . control repairs and adjustments.

(3) Emergency control replacements . . . quick replacement of controls, when necessary, on a *Flat Price Plan* which takes the guesswork out of estimating and billing your customers.

Take advantage of this PENN Authorized Service . . . there are no delays, no headaches . . . just call the Station in your locality. **Penn Electric Switch Co., Goshen, Indiana.** Export Division: 15 E. 40th Street, New York 16, New York., U.S.A. In Canada: Penn Controls, Ltd., Toronto, Ontario.

PENN

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

AMERICAN ARTISAN

RESIDENTIAL
AIR CONDITIONING
WARM AIR HEATING
SHEET METAL CONTRACTING

Member—Audit Bureau of Circulations
Member—Associated Business Publications

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

MANAGEMENT SECTION

News Round-Up — 19
New Heating Theory Gains Acceptance — 55
Simplified Bookkeeping System Solves Problems For Detroit Contractor — 56
Accounting—Language of Business — 59
Damages For Contract Delay — 61
Social Security Extension Brings Self-Employed Contractors Under Provisions of the Act — 63
Depreciation—Important Profit Factor — 65
Restrictive Orders Increase — 67

RESIDENTIAL AIR CONDITIONING SECTION

Layouts For Perimeter Heating — 71
Balancing the Heating System For Indoor Comfort (IV) — 75
Warm Air Unit Heats Auto Salesrooms and Garages — 78
Warm Air Heating Preference Indicated by Department of Labor Survey — 81

SHEET METAL SECTION

Color Dynamics In The Sheet Metal Shop — 85
Reid—Compound Transition Elbow — 88
Die Design For Sheet Metal Forming — 90
Stainless Steel Remodeling Job Helps Sheet Metal Contractor's Business — 94
Basic Types of Welding Operations — 97

DEPARTMENTS

The Editor's Notebook — 6
Association Activities — 103
Equipment Developments — 105
Editorial Index For 1950 — 108
New Literature — 114
Sales Sense by Jack Bedford — 122
Industry Items — 123

EDITOR
John E. Peterson

ASSOCIATE EDITOR
John McCullough

ADVERTISING STAFF
Wallace J. Osborn
New York City
MUrray Hill 9-8293
Robert A. Jack
Cleveland
YEllowstone 2-1580
James D. Thomas
George C. Cutler
Chicago
STate 2-6016
R. Payne Wettstein
Los Angeles—DUnkirk 8-2286
San Francisco—YUkon 6-2527
Portland—ATwater 4107

Published monthly by Kenney Publishing Company, 6 N. Michigan Ave. Chicago 2, Ill., U.S.A. Copyright 1950 by Kenney Publishing Company

Publisher—Frank P. Kenney
Manager—Charles J. Pace
Production Manager—L. A. Doyle
Circulation Director—Frank S. Easter

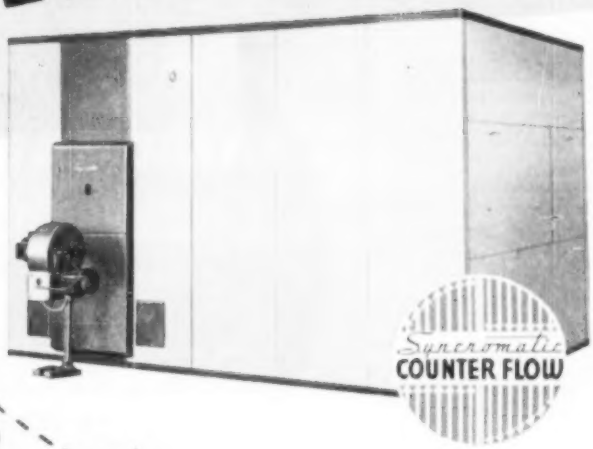
Yearly Subscription Price—U.S. and possessions, $5.00; Canada, Cuba, Mexico, South America, Central America, $4.00; Others, $6.50. Single copies, U. S. and possessions, $.35. Back numbers, $.60. January, 1950, Directory Issue, $3.50 per copy. *Change in Address*: Report new and old address to publisher and local post office; deadline, 25th-28th of preceding month. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the Act of March 3, 1879. Additional entry at Mendota, Illinois

Founded 1864

DECEMBER, 1950

Volume 87, No. 12

from



TO

60,000 B.T.U's **1,000,000 B.T.U's**

For **OIL • GAS or COAL**

SYNCROMATIC

offers you

1. **EXCLUSIVE PATENTED COUNTERFLOW DESIGN.** Produces efficiencies over 80% for all fuels.

2. **STURDY UNEQUALLED FURNACE CONSTRUCTION.** No heat exchanger lighter than 10 Gauge steel insures long operating life. **UNUSUAL FLEXIBILITY** in conversion.

3. **EASE OF INSTALLATION.** Whether large or small **SYNCROMATIC** has been designed to meet the installers problem to save time and needless expense.

4. **PERFECTION IN COMBUSTION.** Because of **SYNCROMATIC'S** unusual smooth flowing heat trap counterflow design it is not necessary to restrict combustion gases in manner resorted to normally to obtain high overall efficiency. As a result in spite of high efficiency **SYNCROMATIC** does not experience combustion problems resulting from internal restrictions. **ANY** good gun type high pressure or low pressure oil burner can be adapted to **SYNCROMATIC** oil fired furnace.

5. **PRICED COMPETITIVELY.** In spite of high quality heavy construction **SYNCROMATIC IS PRICED COMPETITIVELY** for today's market.

SEE OUR EXHIBIT (WHICH WILL INCLUDE HI-CAP) AT THE 10TH INTERNATIONAL HEATING AND VENTILATING EXPOSITION COMMERCIAL MUSEUM, PHILADELPHIA, JANUARY 22 to 26, 1951

Syncromatic Corporation
WATERTOWN, WISCONSIN

Prediction: 1947

It has often been said that hindsight is later than foresight. However, in thumbing through a 1947 issue of AMERICAN ARTISAN, we found a case where some remarkable foresight was demonstrated by our Washington correspondent, Arnold Kruckman.

In his letter in the May 1947 issue, he says: "The vast majority of business people throughout the country seem to be oblivious to the implications of the Greece-Turkey, Korea, etc., program . . . this plan to hedge-in (contain) Russia will eventually cost the nation's pocketbook via taxes collected by the Treasury somewhere between $10 billion and $15 billion per year, and this expenditure probably must go along annually more or less on the same scale, for at least 5 years, and quite possibly more.

"Aside from Greece, Turkey, Korea, it is expected practically every country in the world which shows any slight color of the courage to stand up against the Russians will be given sympathetic consideration when and if it makes a noise that sounds like need of money . . . The purpose of the undertaking is to equip and help train military forces, to build military works, and to reestablish, or initiate the establishment of industries for the economies of the various nations."

Reports on future spending that we hear at the close of 1950 indicate that Mr. Kruckman erred only in being too conservative about the tremendous cost of containing Communism throughout the world.

Sentry
AT-A-GLANCE
REMOTE and DIRECT
READING

TANK GAUGES

FOR BASEMENT TANKS: Type D-O for 2" openings, Type D-10 for 1½" openings.

For accurate, easy reading of tanks — indoors, outside or underground.

Left: Standard type AT-A-Glance Gauge for direct reading of storage tank. Also available with special fitting for use and adaptation with remote gauge for direct readings — both at tank and outside.

Dependable, Inexpensive, Weatherproof . . . Simple Mechanical GAUGES, Easy to Install

Accurately indicates liquid level in remote storage tanks at all times — Not affected by specific gravity oil changes or variations. Simplified mechanical operation eliminates unnecessary fittings, bulbs or levers for oil man to tamper with — no need for access to building. Can be installed for dual location readings — indoors and out. Non-corrosive stainless steel and brass extension lines connect tank float with cast aluminum, weatherproof, thermometer type indicator — calibrated in fractions. Easy to read, unconditionally guaranteed. Write for folder showing complete line.

KRUEGER Sentry GAUGES
GREEN BAY • WISCONSIN

the editor's notebook

Puzzled?

In the Editor's Notebook of our October issue we printed a puzzle that we thought would cause some cogitation on the part of our readers.

Mr. John Henke of Goat Krack Co., Erie, Penn., was a little indignant about our effort. He sent in the correct answer—the ladder will reach 16 ft—and then added a postscript. "Give us some toughies next."

We decided to find out how good this Henke man is. So we have calmly borrowed a puzzle from a certain magazine of metalworking. Mr. Henke knows the answer because he was the first to send it in to this unnamed magazine that is printed in Cleveland. How fast can you figure it out?

Larry reports that the radiator of his automobile has a capacity of 3 gallons and is filled with a 30 per cent antifreeze solution. He wants to increase the antifreeze proportion to 50 per cent. How much of the 30 per cent solution must be taken out to permit a 50 per cent solution if he refills with undiluted antifreeze?

By the way, if you can't buy a copy of that magazine we talked about above, you can always steel one.

Limitations in Metals

The 35 per cent slash in civilian use of aluminum is the strictest limitation yet imposed in the defense program that will be felt in warm air heating and sheet metal shops across the country. The aluminum cut will become effective on January 1, but in December

REGULATION X. A New OPPORTUNITY!

Housing Curbs Seen Spur to Modernizing

Honeywell Sales Official Predicts Big Increase In Home Improvements

A prediction that the new Federal restrictions on home financing will set off a "Building Boom, dr" in the modernization field was made yesterday by Tom McDonald, vice-president of the Minneapolis-Honeywell Regulator Company.

With most authorities predicting that Regulation X will remove at least one-third of the potential buyers from the new home market, Mr. McDonald said that thousands will switch to modernization. By spending up to the legal $2,500 for remodeling they can get a home that has most modern improvements, he pointed out.

"When you figure that $607,000,000 was spent for repair, alteration and improvements during 1949 (according to F. H. A. figures), a year when there were no restrictions on building, it's not hard to foresee a big increase during the next year," Mr. McDonald said. "Housing authorities are estimating that the number of starts next year will be cut from 1,000,000 to 600,000 or 700,000. That means hundreds of thousands of people will not have the new homes they expected to own.

Used homes, from five to forty years old, can be reconditioned to provide comfort and conveniences matching the newly built homes, he said, pointing out that loans for purchase of used homes are not subject to the new controls, unless the loans are insured by the government.

The Honeywell official explained that a home repair program will not only increase the comfort-giving qualities of the house, but will pay future dividends in enhanced property value should the homeowner decide to sell when the housing picture improves.

In a study made of home equipment suppliers by his company it was found that a thorough face-lifting job can be done within the home improvement ceiling stipulated in Regulation X.

For example, a modern automatic heating system can be installed for about $400, Mr. McDonald pointed out. A new improved home thermostat, that turns the heat down in the evening and up in the morning, saving up to 15 per cent on fuel bills, can be added for as little as $35. Installation of a modern kitchen, including new counters, cabinets and sink, will cost about $700. An electric dishwasher, automatic washing machine and garbage disposal unit can be added for another $600. A complete painting job, inside and out, will run from $700 to $750.

Honeywell paves the way with news like this!

THERE'S a bright side to every cloud. And Regulation X is certainly no exception. Already, it's stimulating action in one of the biggest markets that ever existed for the building industry—the 23 million American homes over 30 years old.

By telling this story of home modernization across the land, Honeywell is helping the entire building and heating industries cash in on a new opportunity. Minneapolis-Honeywell, Minneapolis 8, Minn. In Canada: Toronto 17, Ontario.

MINNEAPOLIS
Honeywell
FIRST IN CONTROLS

DEPENDABLE CONTROLS COST LESS THAN SERVICE

THORGAN ARTWORK, DETROIT, 1950

users will be kept to the amount of the metal they used in an average month in the first half of the year.

NPA Administrator Harrison estimates that defense demand will take at least 50 per cent of the aluminum supply next year even if the rearmament program is not expanded. That amount will increase as new defense appropriations are voted.

Other cuts in civilian use of metals are near, next in line probably will be cobalt, zinc, tungsten, cadmium, and manganese. In the field of non-metals there have been cuts in rubber and building materials, the latter through the ban on amusement construction and the tightening of credit.

The government hopes rearmament will not bear down too heavily on small business. Small concerns were handed a dubious exemption in the aluminum order by freeing 1,000 pounds from the limitations in the order. Steel mills have been ordered by the government to take care of small business needs but it is not clear how business can cash in on this provision. It's like fishing in a stream where there are no fish.

Bread and Butter

In Norway, the irresistible force of planned inflation met the immovable object of planned prices. Something had to give, and as you might expect, that something was prices. Government fixed bread and flour prices jumped 40 per cent, coffee 100 per cent, and oleomargarine 125 per cent. These price increases were made shortly after the election in which the present government was returned to office amid promises of stable prices.

Politician vs. the People

A politician must be a self-promoter. He seeks, discovers and needs everlastingly new issues and new problems to exploit.

Very few laws and very few government proposals and programs ever originate with the masses or the general public. They come primarily from government bureaus and the offices of politicians.

In the recent hearing on President Truman's proposal for government aid to small business the following colloquy took place:

Senator: "Yes, I understand that. They are putting up $10 million to start with. I know Congress, and the next step will be $25 million, and the next step will be to increase the $25 million limit to $50 million, and the next step will be to $75 million, and the next step will be to $100 million."

Witness: "That is a very interesting prospect."

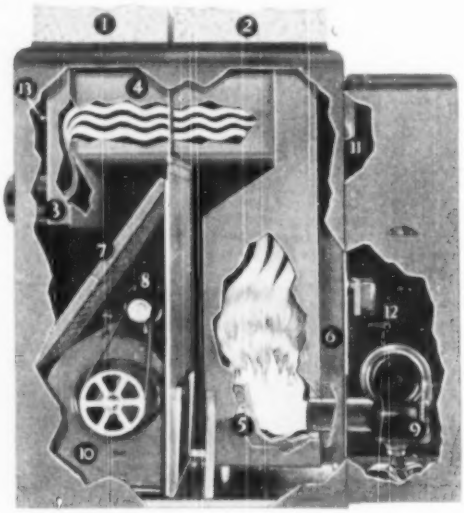
Senator: "You see, a Congressman or a Senator has to have something to run on. When you get the $25 million limit in, he has to say to the small businessmen: 'Now, that is just not enough. It has got to be $50 million. I am going back to Congress now and make it $50 million.' That is the history of all these schemes. I am not arguing the merits or demerits of them at the moment. I am just giving you the history."

Witness: "I understand."

—*Economic Intelligence*

Better Built for Better Service

These large, heavy-duty furnaces (Models OH-2165 and OH-2200) are designed for large residences, apartment buildings, churches, factories, garages, office buildings and airports. Careful isolation of products of combustion from transfer surfaces of economizer section plus counter-flow of air through furnace insures maximum heat transfer, minimum stack temperature and low operating cost.



Check SUN Features Point by Point

1. Return air plenum
2. Warm air plenum
3. Outlet radiator
4. Economizer tubes
5. Refractory firing chamber
6. Burner access pouch
7. Air filters
8. Cushioned blower motor
9. Oil burner
10. Centrifugal blower
11. Cleaning scrapers

WRITE FOR LITERATURE AND PRICES

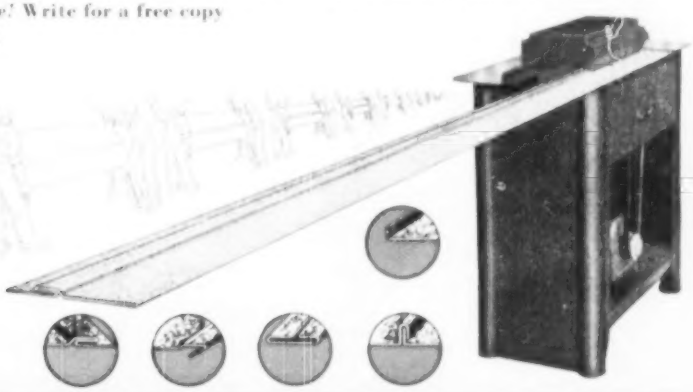
J. V. Patten Company
SYCAMORE, ILLINOIS, U.S.A.
ESTAB. 1898 • INC. 1928

"...and not one cent for repairs!"

Lockformers make Pittsburghs (and other seams) 15 to 20 times as fast as hand methods—cut overall fabrication costs in half—pay for themselves quickly out of the savings they effect. And, as reported by Mr. McMullen, and by *actual performance records* of thousands of Lockformers in shops all over the world, Lockformers are just about "wear-out-proof"—*keep on* earning "extra" profits, year after year after year!

For the safest investment you can make, and one that pays the highest of dividends, get a Lockformer *and be sure!* Write for a free copy of our current Catalog.

ONE MAN WITH A LOCKFORMER MAKES MORE PITTSBURGH LOCKS THAN SIXTEEN MEN WITH EIGHT BRAKES.....



THE LOCKFORMER CO.

4615 WEST ROOSEVELT ROAD • CHICAGO 50, ILLINOIS

the editor's notebook

Clothes Dryer

Where to put dripping overshoes, rubbers, and umbrellas when entering the house in wintertime is always a perplexing problem. There is a solution which comes from the National Warm Air Heating and Air Conditioning Association. The association points out that the warm air heating system can be used advantageously to provide convenience as well as comfort for the home.

It is wise to have a clothes closet located near every entrance door to the house for convenience when removing outdoor wearing apparel. Select one of these closets which will be used the most during the winter months. Install a sheet metal floor in this closet with a small drain that can be connected with the drain section of the plumbing system.

About 6 in. above this floor install a metal grid shelf on which the family can place their rubbers and overshoes. The rest of the closet can be constructed according to regular closet design.

Then run a small 4 in. duct from the warm air heating system into the closet, capping it with a 4 by 6 in. warm air register. This will admit a constant flow of warm air into the closet which will melt the accumulated snow on coats and overshoes. This water will drip to the sheet metal floor and flow down the drain out of the house. Make sure the closet door has a 1½ in. clearance at the bottom to facilitate circulation of warm air.

A-Bomb Effects

A bomb of TNT (trinitrotoluol) reaches a maximum temperature of 5,000 deg Centigrade; an atomic bomb a temperature of 1,000,000 deg Centigrade.

The energy released by 20,000 tons of TNT is equalled by the explosion of a single conventional-sized atomic bomb (22 pounds of fissionable material—uranium 235 or plutonium 239).

It would require 1,000,000 conventional atomic bombs to release as much energy as a strong earthquake.

A conventional atomic bomb's energy released by explosion is equal to the energy from the sun's rays on a two-mile square area of the earth's surface on a normal day.

The light (luminosity) released by a conventional atomic bomb at 10,000 yards (5.7 miles), just 1/1000 of a second after explosion is equal to the light of 100 suns.

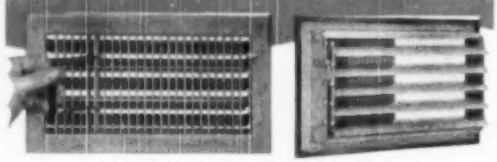
The characteristic atomic cloud reaches an altitude of 10,000 ft in 0.8 second, traveling at a speed of 200 miles per hour. When the cloud reaches 30,000 ft in 8.5 minutes, it is slowed down to 12 mph.

The burst of an atomic bomb has a negligible effect on the weather.

One-third of an atomic

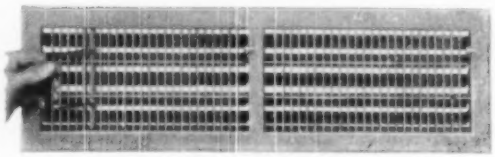
You can get
DIRECTED AIR FLOW
at any angle with

INDEPENDENT "Fabrikated" AIR CONDITIONING REGISTERS



321-A HMV — Rear View Showing "HMV" Valves

Every grille bar adjustable individually—before or after installation



321-A HMV Tandem

Any direction of air flow—right, left, up, down and any combination—is easily obtained with "Fabrikated" Style No. 321-A HMV air conditioning registers, for residence or commercial installations, on sidewalls or ceiling. The face bars are adjustable to right or left; valves on the back are adjustable to direct the air flow up or down; valves may also be fully closed, and are connected to open or close in unison.

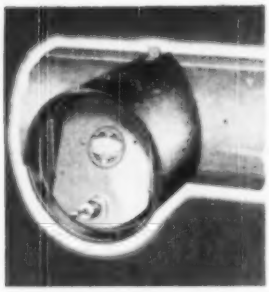
The angles of deflection and the combinations to be had are practically unlimited. Adjustments for directed air flow may be made before or after installation. Grille bars are held firmly in place and will not vibrate or rattle.

"Fabrikated" registers are available in sizes from 8 x 4" to 48 x 24", including tandem style. Special sizes can be made without special die set-up charges.

Write for Catalog No. 50.

Always Leading—Always Progressing

THE INDEPENDENT REGISTER CO.
3747 E. 93rd STREET • CLEVELAND, OHIO



FIELD TYPE "M",

first choice with the leading manufacturers, jobbers and dealers of heating equipment.

FIELD SCOTTY,

pre-set or adjustable, first choice with manufacturers, jobbers and dealers of stoves and ranges.

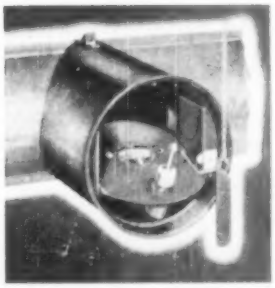
field means Finest in BAROMETRIC DRAFT CONTROLS

FIELD RNA-W,

first choice with manufacturers, jobbers and dealers of hot water heaters, finest control made for this purpose.

FUEL SAVING SYSTEM,

newest and finest of damper motor systems. A profitable door-opener with hand-fired homes.



FIELD "BAROCHEK",

combination check damper and barometric draft control. Makes any hand-fired furnace more efficient.

field CONTROL DIVISION

of H. D. Conkey & Company, MENDOTA, ILLINOIS

AFFILIATES: Materials Handling Division — Cranes & Hoists
Conco Building Products, Inc. — Brick, Tile & Stone

See our exhibit at the 10th International Heating & Ventilating Exposition, Commercial Museum, Philadelphia, Jan. 22 to 26, 1951, Space No. 708

bomb's nominal energy at the time of explosion is released in the form of thermal (heat) radiation, and is equal to 8,000,000 kilowatt hours. Electrically, this would furnish enough power to light, 24 hours a day, an ordinary 100 watt bulb such as used in homes, for nearly 1,000,000 years.

Half life (i. e., the time taken for the activity of a given quantity of a radioactive material to decay to half its initial value) may be as short as less than one-millionth of a second for polonium 212 or more than 10,000,000,000 years for thorium 232. (*The Effects of Atomic Weapons*.)

Cooperation

For many years the Better Business Bureau of St. Louis has been severely critical of the practices of a local furnace branch office. Many bureau bulletins have carried stories of what happened to persons solicited by salesmen of the concern.

On June 15, 1950, the local manager conferred with bureau officials for the purpose of clearing up the local situation. After a discussion of bureau files he promised complete cooperation.

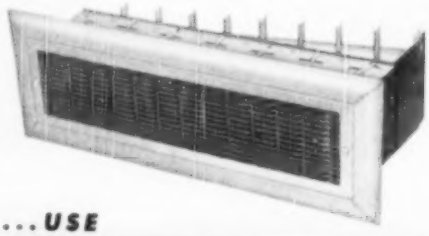
Specifically, it was agreed that the term "engineer" was not to be used in any sales canvass; that the "tearing down" technique which the manager stated had not been used for several years would not be employed; that whenever a conversion unit was sold, under the assumption that the furnace was in good condition, and when upon installation it was found that the furnace needed extensive repairs or replacements not considered in the original contract, the signer of the contract would be offered the opportunity to re-examine his agreement; and that whenever a sales contract for repairs was signed by a consumer, and the actual work disclosed that the furnace was beyond repair, that no charge would be made for the labor involved in determining such facts. It was generally agreed that the bureau would screen all cases existing at that time and that some satisfactory solution would be sought. All future cases would be called to the attention of the manager.

That conference was held over four months ago. The experience of the bureau since that time has indicated that his assurances were made in good faith and carried out. For illustration, since June 15th, 38 cases have been brought to the bureau. Of these 20 were found to be the result of a misunderstanding, or otherwise unjustified. Thirteen contained elements of possible criticism of the company's practices. All 33 have been adjusted to the complainant's satisfaction. Five cases are pending.

From the time of the meeting to date, a decline in the number of complaints reaching the bureau has been noticeable. It appears from the recent experiences that the company is making a sincere effort to conduct its business legitimately.

The bureau has been promised and expects continued full cooperation of the furnace company. This formal announcement of a most satisfactory culmination of a long standing problem was made with considerable satisfaction.

Aye! Ye can SAVE MONEY!



...USE

BARBER-COLMAN

DOUBLE-DEFLECTION GRILLES *with* INTEGRAL VOLUME CONTROL *and* DEFLECTROL

✓ NO DUCT TAKE-OFFS NECESSARY.

✓ FACTORY-ASSEMBLED UNIT REQUIRES ONLY ONE INSTALLATION OPERATION.

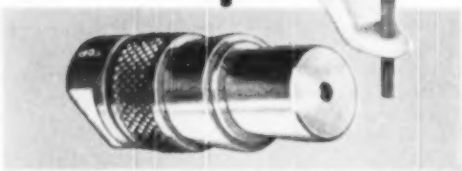
✓ SYSTEM BALANCING TIME REDUCED TO A MINIMUM—FULL ADJUSTMENT—VOLUME AND DIRECTION—AVAILABLE AT EACH OUTLET.

✓ GRILLE CORE REMOVABLE FOR CLEANING AND INSPECTION PURPOSES.

✓ DURABLE ELECTROPLATED FINISHES.

CONSULT YOUR BARBER-COLMAN REPRESENTATIVE OR WRITE FOR COMPLETE DETAILS.

BARBER-COLMAN COMPANY
1234 ROCK STREET • ROCKFORD, ILL.



THE WINKLER NON-CLOG TURBA NOZZLE

SEE THE DIFFERENCE

The illustrations above show why the Winkler Nozzle makes oversizing of the burner unnecessary. The extremely large opening does not become clogged with dirt or carbon—and changes in oil viscosity do not affect its capacity.

Other Winkler features: The *Fuel Meter*—positively meters the same amount of oil, regardless of viscosity . . . the *Fuel Aerator*—intimately mixes exact amounts of air and oil . . . the *Flame Controller*—assures complete and quiet burning of every particle of oil.

YOU'LL GET HIS ATTENTION... **when you demonstrate the amazing performance of the Winkler LP* in burning crankcase drainings—heavy unrefined oils—mixed oil and water—all without smoke or soot!**

YOU'LL GET HIS ORDER... **when you show him how Winkler owners the country over are saving up to 50% in fuel—and virtually eliminating service!**

You've never had a better chance to crack a market fairly oozing profit opportunities! Literally, every home in your area with a pre Winkler oil burner is a prospect for a replacement sale.

The Winkler LP* story is sensational—*and you can make it stick!* By actual demonstration and by the testimony of delighted owners, the Winkler LP* Oil Burner can be proved an outstanding money-saver.

You don't have to oversize a Winkler LP*!

This *low pressure* burner ends fuel waste because its non-clog Nozzle and built-in Fuel Meter permit exact sizing of the burner to the heat requirements of the building. It uses as little as ½ GPH. It is not critical of oil . . . . to see the Winkler LP* burn crankcase drainings, unrefined oil, mixed oil and water is a revelation of oil burner efficiency you've never before witnessed!

So why not get your cut—write to the factory for information on the Winkler LP* Oil Burner and the complete line of Winkler Automatic Heating Equipment.

FREE SALES TRAINING AT WINKLER SCHOOL

This free profit-course is open to all Winkler Dealers and their salesmen. Trains salesmen to do a hard hitting job of selling Winkler Automatic Heating Equipment—acclaimed amazingly successful in stepping up sales and profits.

WINKLER

Automatic Heating Equipment

Oil, coal, gas-fired Boilers and Furnaces . . . Wall Furnaces . . . Stokers . . . Gas Conversion Burners . . . Oil Burners

U. S. MACHINE CORPORATION
Dept. A-120,
Lebanon, Indiana

What is the meaning of

Controls You Can Trust

AS each of us approaches the hallowed Christmas Season and faces up to the challenge of a New Year, perhaps a re-examination of what makes our business lives rich and rewarding may not be amiss.

WE put our trust in God . . . in our country . . . in our family . . . in our friends. Each of them repays this trust in ways that make life good. We come to see in business, too, trustworthiness as a fundamental factor contributing to the satisfactions of our working hours.

A FEW months ago, the whole business philosophy of Perfex was condensed into these four words: "Controls You Can *Trust*". This was done deliberately, thoughtfully, with a full realization of the responsibilities involved.

TO us, this phrase means many things. It means representatives you can trust—men who live up to their promises. It means employees you can trust to do their level best in producing good, dependable controls. It means designing talent you can trust to develop the best possible controls from the best materials for the purpose. It means management you can trust to provide every necessary modern facility, to make certain that trustworthy controls reach you at a fair price, at the right time, on a continuing basis.

TO us, "Controls You Can *Trust*" is no empty phrase, no clever combination of words, no mere advertising slogan. Rather, it expresses in another way what we have earnestly endeavored to be since we entered the controls business in 1934—"good people to do business with". It is the business philosophy we live by . . . and this simple, powerful code of conduct gives us fresh heart to meet the ever increasing problems which confront us each day.

IT is our sincere hope that the benefits which accrue to you from placing your trust in Perfex products will cause you to find your business life ever more satisfying and profitable in the months and years ahead.

PERFEX
CONTROLS YOU CAN TRUST

PERFEX CORPORATION, MILWAUKEE, WISCONSIN
In Canada, Perfex Controls Ltd., Toronto 1, Canada

Christmas 1950

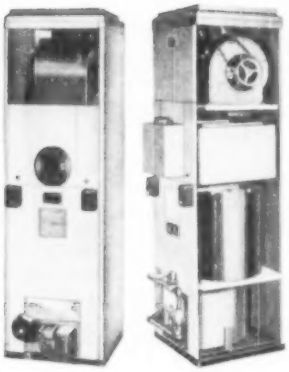
AUTOMATIC TEMPERATURE CONTROLS • INDUSTRIAL ENGINE RADIATORS • COLOR PROCESS PRINTS

Luxaire

Performance · Proved

GAS and OIL COUNTERFLOW UNITS

for Perimeter Heating Installations



At left: Oil Counterflow Unit, showing blower located at top of cabinet.

At right: Interior view of Gas Counterflow Unit.

Typical duct system for a perimeter heating installation before pouring concrete slab floor. Counterflow unit to be installed over pit in center of duct work.

Luxaire Counterflow Units have been designed for the most direct and economical heating of basementless houses.

Pioneered by Luxaire engineers, they bring the advantages of Perimeter heating — with heat pipes imbedded in the concrete floor slab — to ranch type and similar basementless dwellings, that formerly were plagued with complaint of cold floors.

Designed for installation in such restricted places as closets, alcoves and utility rooms, Luxaire Counterflow Units require little space, being listed by Underwriters Laboratories for "close clearance" to combustible surfaces.

Luxaire Counterflow Units are shipped factory assembled, ready for the installation of either the Luxaire Gas Burner or the Luxaire Oil Burner — whichever your customer wants. These units are equally efficient with either fuel.

THE C. A. OLSEN MANUFACTURING COMPANY · · ELYRIA, OHIO

Luxaire

HEATING & AIR CONDITIONING UNITS

A Merry Christmas
a Prosperous New Year
and a
MILLION THANKS

TO ALL OF OUR GOOD CUSTOMERS WHO UNITEDLY HAVE MADE

1950

THE BIGGEST YEAR IN OUR LONG HISTORY

"The finest conceivable endorsement, we believe, of the high quality character of H&C products and service.

H&C

HART & COOLEY MANUFACTURING COMPANY
500 EAST EIGHTH ST., HOLLAND, MICHIGAN

IN CANADA: HART & COOLEY MFG. CO., FT. ERIE, N. ONTARIO

WORLD'S LARGEST PRODUCERS OF REGISTERS, GRILLES, AND FURNACE ACCESSORIES

the WEIR-MEYER dealer is a "*Preferred Person*"

Sales set a new record this year—yet WEIR-MEYER still gives *prompt* delivery anywhere in the nation!

We're delivering *more* furnaces to *more* dealers than ever before! Still, factory expansion enables us to make prompt delivery to *all* dealers—including the new ones who are signing up now!

Find out if you qualify for exclusive rights to a Weir-Meyer dealership in your territory. Sell the complete line produced by the pioneer manufacturer of steel furnaces . . . with sales help from a tested merchandising program. The coupon below will bring you information on how you can become that "*preferred person*"—a Weir-Meyer dealer.

Here's what dealers say about WEIR-MEYER delivery:

"I liked the Weir-Meyer line when I was 8—but doubted that delivery could equal my former suppliers, who were just a few miles away. After I built Weir-Meyer I found that delivery was even better than the salesman's promise."

The Farm Tire Shop
Casper, Wyoming

"Most of the furnaces I sell go into new homes. That means delivery must be on time. Weir-Meyer and every comes through on schedule but is priced to meet competition in this cost-conscious new home market."

Schroeder Furnace Co.
Austin, Minnesota

"This is our first year in the heating business—and an extremely successful one, thanks to Weir-Meyer. We were told that every Weir-Meyer dealer gets immediate delivery and we've found out for ourselves that it's true."

Brand Appliance Co.
Terre Haute, Indiana

"With my Weir-Meyer sales increasing 100% last year, I've added two new salesmen to my staff. Even with this increased volume I find that Weir-Meyer deliveries are well ahead of my installation crews."

Berry's Better
Heating Service
Decatur, Illinois

"I'm located in the northern tip of Maine, over 1100 miles from the Weir-Meyer factory. Yet deliveries have been so prompt that I've never had to hold up on a customer's order."

Guy Belanger
Ft. Fairfield, Maine

WEIR-MEYER MEANS *Modern* HEAT

THE MEYER FURNACE COMPANY
General Offices: Peoria 2, Illinois

WEIR-MEYER FURNACES

MEYER FURNACE COMPANY
Dept. LO2, Peoria 2, Ill.
Please rush information on Weir-Meyer Protected Dealerships.

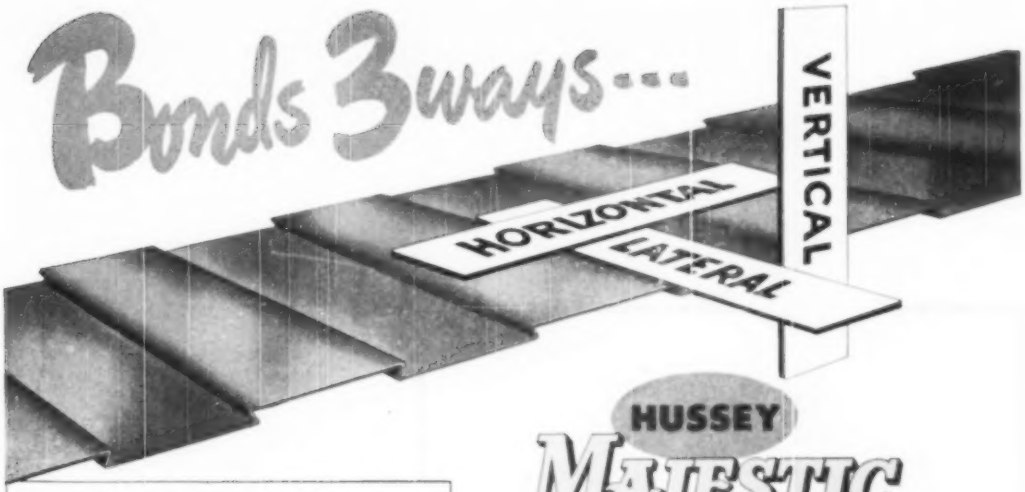
Name .....
Street .....
City ..... State .....

Manufacturers of Weir & Meyer Furnaces • Air Conditioners for Gas—Oil—Coal • Factories: Peoria and Peru, Illinois

MERRY CHRISTMAS

VICTOR
FURNACES
WITH FUEL
SAVING FINS

HALL-NEAL FURNACE CO.
1322-44 N. CAPITOL AVE., INDIANAPOLIS, INDIANA

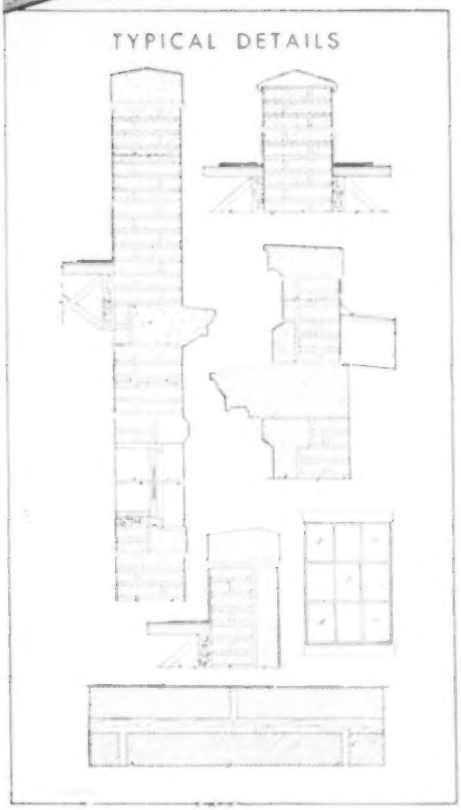


HUSSEY

MAJESTIC

3-Way Thru Wall

COPPER FLASHING



Safer, Surer, Better

For positive protection against crumbling parapet walls, stained facing and other seepage damage, install Majestic 3-Way Thru Wall Copper Flashing. Now protecting some of the finest buildings in America, it has a special cutback design which permits a rigid three-way bond.

Quickly and securely made a part of the masonry, this flashing is manufactured from corrosion-proof, moisture-proof Hussey Copper. Installation is fast and trouble-free. Even the setting of large blocks presents no damage problem, since the keys were designed to bear part of the weight.

On the fine buildings which must stay leak-proof and free from seepage, your surest and safest protection is Majestic 3-Way Thru Wall Solid Copper Flashing.

HUSSEY

C. G. HUSSEY & COMPANY

(Division of Copper Range Co.)

Rolling Mills and General Offices:

PITTSBURGH 19, PA.

PITTSBURGH	2850 Second Avenue
CLEVELAND	5318 St. Clair Avenue
NEW YORK	140 Sixth Avenue
CHICAGO	3900 N. Elston Avenue
ST. LOUIS	1620 Delmar Boulevard
PHILADELPHIA	1632 Fairmount Avenue
CINCINNATI	424 Commercial Square

IMMEDIATE DELIVERY ...ORDER NOW!

There's beauty in the new

AMER-*glas* REPLACEABLE FILTER

with a beautiful profit for you

COMPARE new AMER-glas with any replaceable filter you've ever seen and at once you are impressed with the superior features. This filter media is continuous curled glass filaments, bonded into a uniform pad, coated with non-flammable Viscosine.

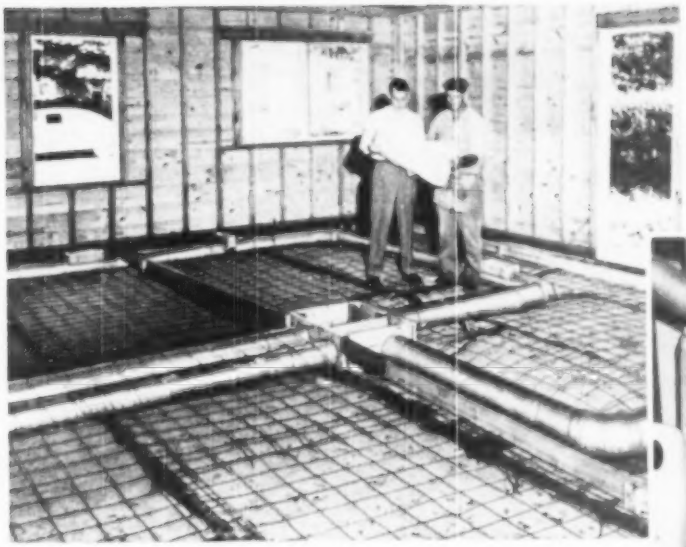
The pad of AMER-glas filter is strong, flexible and resilient—crush it and it springs back into shape. Note too the fluffy media is lively, does not tend to mat down. This means free passage of air, with greater dust retention for superior performance.

PROFIT NOW by stocking and selling AMER-glas replaceable air filters. *PRICED* to compete. *Protected* by a clean-cut policy of jobber-dealer distribution. Quality assured by American Air Filter . . . the greatest name in modern air cleaning. Send for complete information now.

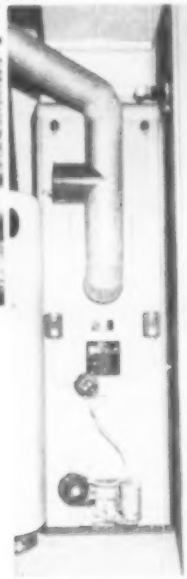
AAF **American Air Filter**
COMPANY, INC.

AMERICAN AIR FILTER CO., INC.
355 Central Ave., Louisville 8, Kentucky
Please send prices and complete information on AMER-glas filters.
Name _____
Address _____
City _____ State _____
Type of Business _____

AMER-*glas*
REPLACEABLE AIR FILTERS



Warm air Perimeter heating duct system installed in basementless home prior to pouring the concrete floor slab. Unit will be installed directly over pit located in middle of the duct system.



Moncrief OIL Fired Counterflow Unit installed in Utility Room.

Successful PERIMETER HEATING

with MONCRIEF *Counterflow* Units

both GAS and OIL Fired

Moncrief Counterflow units assure the comfortable, economical heating that builders and architects are installing and specifying for ranch type homes — for homes without basements, homes with concrete floor slabs.

With the heat pipes imbedded in the concrete floor slab radiating a portion of the heat directly to the floor, as the warm air circulates from furnace to registers, builders everywhere are turning to Perimeter Heating and Moncrief Counterflow Units as the satisfactory and low cost combination for heating basementless homes.

Moncrief Counterflow units are designed and approved for successful operation as either a Gas or an Oil fired unit. They are quick and easy to install as they are shipped factory assembled ready for the installation of the Moncrief burner — Gas or Oil — whichever is preferred.

Your Moncrief jobber can supply you complete details.

Moncrief GAS FIRED Counterflow Unit.

THE HENRY FURNACE COMPANY • *Medina, Ohio*

HEATING AND AIR CONDITIONING UNITS — MONCRIEF SINCE 1903 — FURNACE PIPE AND FITTINGS

IT'S A HIT!

VIKING'S NEW "2300" HUMIDIFIER IS MAKING SALES RECORDS

say Viking Salesmen

ALL OVER THE COUNTRY

Lowell A. McCord
St. Louis, Mo.

Lyall M. Bush
West Springfield, Mass.

"My Dealers like the Adaptability of the VIKING '2300' Humidifier"

says H. L. Slankard, Hoe Supply Co., Paducah, Ky.

● "The evaporating capacity of the Viking Series '2300' Humidifier can be adapted to meet the needs of any home—large or small. Because the '2300' is only 12" long, it'll fit into even the most compact heating unit. That's important to my dealers—and to me. We don't have to stock a variety of types and sizes of humidifiers and this frees valuable storage space . . . Cuts inventory investment."

Read what the VIKING "2300" Humidifier means to These Dealers!

Fred Wiedersheim
25 Tracy St., Springfield, Mass.

"I like the '2300' Humidifier because I can sell it with confidence. The Foam Glass Float is dependable. It can't corrode or be punctured and the new, deeper float tank gives more accurate control of water flow. The permanently baked on instructions on the access plate are always there so the customer can make necessary adjustments. This saves me money too, by eliminating call-backs."

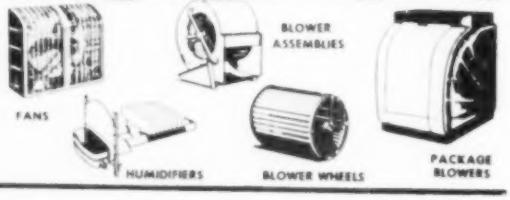
Charles L. Stanton, Jr.
326 West Lancaster Ave.
Ardmore, Pennsylvania

"Easy installation on the '2300' Humidifier is what I like. The pan assembly slides into the plenum like a drawer and just two wing nuts make pan levelling easy. And no special tools are needed for the installation. These are a few reasons why I can do a good job fast."

M. T. Robertson
Modern Service Co., Paducah, Ky.

"I like the Viking '2300' Humidifier because it doesn't take much service. Features like the Hard Chromed Top Seat Float Valve and the puncture proof Foam Glass Float are a guarantee against time-consuming and costly call-backs once the '2300' is installed."

Viking
AIR CONDITIONING CORP.
5601 Walworth, Cleveland 2, O.



It's profitable to

PUSH DUST-STOP* FILTERS NOW!

Get easy profits now while the DUST-STOP Air Filter season is booming. People who forgot filters in the fall want 'em now. Others are ready now to buy their second filter replacement for cleaner homes, better heating, lower fuel bills.

Displays, stuffers, post cards are available to help you cash in on DUST-STOP, the *nationally advertised, fast-turnover* air filter. Ask your wholesaler for them. Or write Owens-Corning Fiberglas Corporation, Department 35L, Toledo 1, Ohio.

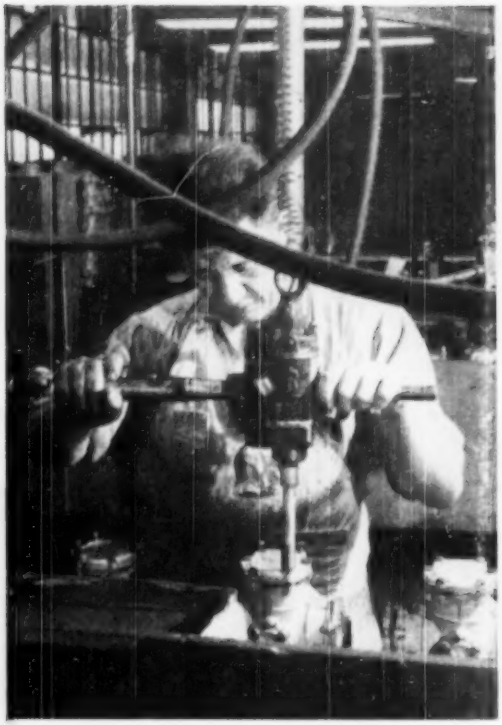
It pays to push the original . . .

OWENS-CORNING FIBERGLAS

DUST-STOP* AIR FILTERS

UL

*DUST-STOP is the trade-mark of Owens-Corning Fiberglas Corporation for impingement-type air filters made of glass fibers. FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.



Tony's CONFIDENCE Comes from Al's ACCURACY

Antonio Coputo assembles gasoline pump meters in the plant of Gilbert & Barker Mfg. Co.

Tony's employers have provided him with the best possible equipment to do his work well, speedily and with the least amount of effort.

He has a light, airy working place, a spring-suspended power driver, and RB&W cap screws—the cap screws he uses with confidence because they are uniformly accurate.

Such uniformity is one reason why so many of the country's most progressive firms depend on RB&W bolts, screws, nuts and rivets.

Alfred Robbins operates RB&W's latest wire-drawing equipment. He oversees a process which is vital to quality, for RB&W draws its own wire, using tungsten carbide dies, in order to insure closest tolerances for cold-heading.

By this and other means of controlling raw materials, men like Alfred Robbins insure the accurate dimensions of RB&W fasteners . . . so that men like Tony Coputo can work with perfect confidence in their fasteners.

For lowest fastening costs, select the brand of fastener that is *always dependable*—RB&W.

RB&W

The Complete Quality Line

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland. Sales agents at: Portland, Seattle. Distributors from coast to coast.

105 Years Making Strong the Things That Make America Strong

include Snaptite Eaves Trough; "K" Gutter; Plain Round; Corrugated Round and Corrugated Square Conductor Pipe; Ridge Roll; Flashing; Roll Valley; plus a complete line of all necessary fittings. All are made of 28 gauge Republic ENDURO Stainless Steel, type 301, No. 2 Satin Finish.

"I recommend Stainless Steel for roof drainage

—I see it used for exposed parts of buildings everywhere . . . for entrances . . . for paneling entire outside walls . . . for hotel, theatre and apartment marquees . . . on famous towers like the Chrysler and Empire State Buildings . . . so, I know stainless steel is the natural material for exposed roof drainage systems, too."

You can get started with stainless in '50

Berger manufactures a *complete line* of high-quality stainless steel roof drainage products for you. Jobbers carry them in stock. They are made of tested Republic ENDURO Stainless Steel—the metal proved by more than twenty years of service in buildings of every type.

Berger ENDURO Drainage Systems are—

- Stronger, more attractive than ordinary systems
- Do not rust or tarnish
- Are easy to handle and hang, easy to solder
- Do not bleed or discolor paint
- Resist abrasion and denting
- Cost your customer less in the long run
- Make money for you

See your jobber or write us for more information

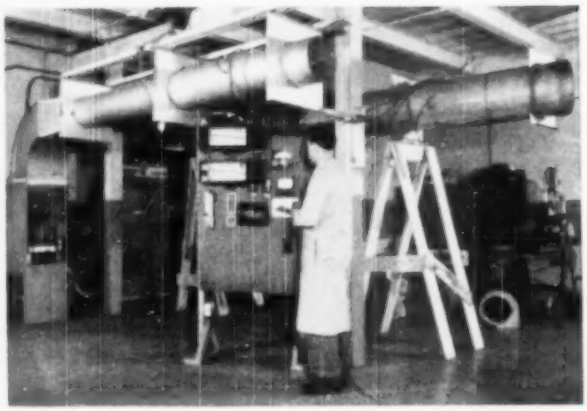
BERGER MANUFACTURING DIVISION

Republic Steel Corporation • Canton 5, Ohio

Warehouses in Boston, Detroit, Indianapolis, Philadelphia, St. Louis

Why Build Your Blower Assemblies

Around Stock Blowers?



Customer's Equipment being tested in Morrison Laboratory

MORRISON will custom-design for you, Blower Units that will fit space requirements and furnish sufficient capacity.

Rather than handicapping you by forcing you to build your assemblies around blowers, Morrison helps you to engineer your Blower Assemblies as an integral part of your own product.

MORRISON

BLOWER WHEELS

Complete Engineering Services, with all drawings and templates, are furnished manufacturer for building their own blower assemblies.

Morrison Airstream Blower Wheels — 10" to 16" double width, double inlet.

Write for Complete Morrison Catalog!

MORRISON PRODUCTS, INC. 16816 WATERLOO ROAD CLEVELAND 10, OHIO

SEE NIAGARA MACHINES ON PARADE

AT 10th AIR CONDITIONING EXPOSITION IN PHILADELPHIA JANUARY 22-26, 1951

MODERN MACHINES FOR MODERN PRODUCTION See how these modern sheet metal machines will fit into your shop and save time, cut costs and produce quality work. See the latest Niagara all steel SQUARING SHEARS, the ROTARY MACHINES, high speed CIRCLE SHEARS, BAR FOLDERS, SLIP ROLL FORMERS, COMBINATION ELECTRIC MACHINES and the HAND TOOLS. Above all don't miss the new MULTI-DRIVE POWER DRIVE TABLE which quickly converts hand operated rotary bench machines to power operation with increased production.

Ask for latest Niagara Bulletins at the Show or by mail.

NIAGARA BOOTH No. 926

Commercial Museum

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

America's Most Complete Line Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

SOMETHING TO REMEMBER WHEN SELECTING A HUMIDIFIER FOR MODERN WARM AIR HEATING SYSTEMS . . . . . .

ONLY MAID-O'-MIST

CONVECTOR HUMIDIFIERS

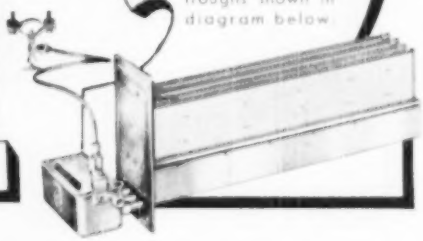
OFFER THESE *3 BIG ADVANTAGES*

50% less
INSTALLATION TIME!

Just cut out opening in plenum, attach plenum flange frame, slip in factory assembled unit and make water connections—that's all.

30% more
EVAPORATING AREA!

Due to unique design of water troughs shown in diagram below.



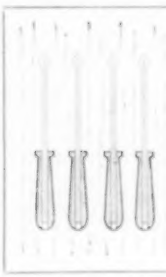
60% less
AIR RESTRICTION IN THE PLENUM!

Permits use in small plenums of modern warm air furnaces.

Pre-assembled unit cuts installation time in half!

To make it easier for you, Maid-O-Mist assembled all the parts of these convector humidifiers here at the factory. The only thing you have to do is cut the proper size opening in the plenum, attach the plenum flange frame, and make the necessary connections. No tedious fitting or fastening to the back of the plenum. The unit is entirely supported by the flange frame in front.

And remember, Maid-O-Mist convector humidifiers can be fitted to either vertical or sloping bonnet furnaces. There's a type for every installation, permitting adjustment of up to 30° pitch for sloping bonnet furnaces.



Free flow of heated air

between evaporation pads and all sides of humidifier is shown in diagram. This exclusive design reduces air resistance 60%. Also puts every inch of the humidifier to work. Actually provides 30% greater evaporating area!

Available in 13 different sizes!

Maid-O'-Mist Convector Humidifiers have evaporation capacities of 1 to 10 gallons of water per day, depending on size. Made entirely of non-ferrous metal and equipped with automatic (float-operated) supply valve. You can recommend Maid-O-Mist to your customers with assurance . . . you can install Maid-O'-Mist with ease, speed and profit. Get full information from your jobber, or write for Bulletin 701-B.

MAID-O-MIST Inc
HEATING SPECIALTIES

AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES

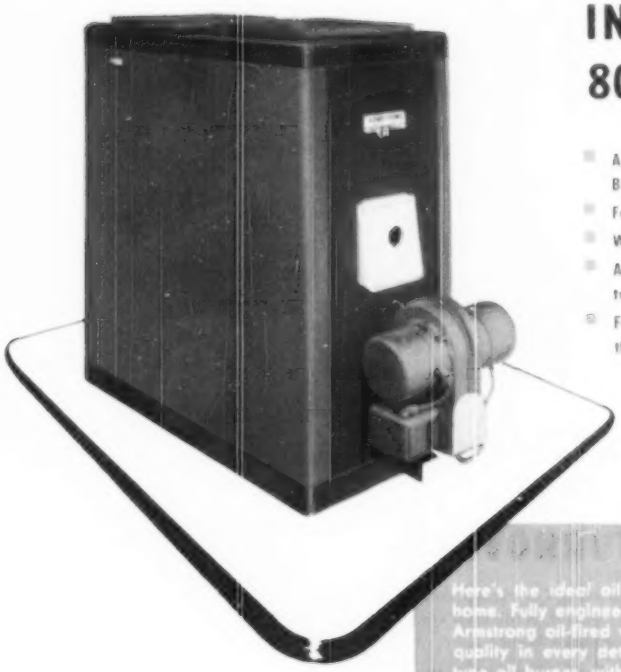
MAID-O'-MIST, Inc.

3217 NORTH PULASKI ROAD . CHICAGO 41, ILL.

it's a *new* ARMSTRONG

oil-fired winter air conditioner

IN THE POPULAR 80,000 BTU SIZE!



- A quality unit for the small home—80,000 BTU at the bonnet.
- Factory assembled.
- Welded steel construction throughout.
- Attractively styled—beautifully finished in two-tone blue baked enamel.
- Fired by the Armstrong oil burner with the EXCLUSIVE Turbo-Regulator.

QUALITY SEA SERIES

Here's the ideal oil-fired unit for today's popular small home. Fully engineered, carefully manufactured, the new Armstrong oil-fired winter air conditioner represents real quality in every detail. It's fired by the Armstrong gun-type oil burner, with the exclusive Turbo-Regulator assuring high-efficiency firing, even in the relatively low firing range. The Turbo-Regulator combines control of the volume and turbulation of the air at one point — makes adjustment extremely easy.

The welded steel heating element, through careful design and construction, assures maximum heat transfer and long, trouble-free service. The attractive two-tone blue enameled steel cabinet is a plus feature in appearance — one which helps to sell the lady of the house. Readily convertible to gas firing, it meets changes in fuel preference. All the way, it's a unit which will build customer satisfaction.

See your Armstrong jobber for information about this new unit — or any unit in the Armstrong line of warm-air heating equipment. It's a complete line, with a unit for any warm-air heating need or preference—any size, any style, for any fuel. If you don't know the Armstrong jobber, write to us for his name. If you're a jobber, write for details on Armstrong's selective distribution.

SEE OUR EXHIBIT AT
THE 10th INTERNATIONAL
HEATING SHOW,
JANUARY 22-26,
PHILADELPHIA

Look to Armstrong for leadership in warm-air heating. A complete line — oil, gas and coal.

ARMSTRONG
FURNACE COMPANY

INFORMED OIL APPLIANCE SALESMEN INCREASE VOLUME AND TURNOVER!

Do *your* salesmen know that a Vaporizing Oil Heater, combined with A-P Automatic Comfort Control, is the *most economical, most modern* way to heat a small home?

When you tell your men that a Space Heater with this A-P Control . . . plus this A-P Comfort Control Top Thermostat and Transformer will give every small home owner or renter the cheapest heat and the most comfort, they'll sell the combination easily and enthusiastically. It means greater volume and greater profits to you. And you can sell the A-P Automatic Comfort Control to present owners of Oil Heaters made since 1939, equipped with A-P Controls.

AUTOMATIC PRODUCTS COMPANY
2452 North Thirty-Second Street, Milwaukee 45, Wisconsin

DEPENDABLE OIL Controls

Standard Equipment on Vaporizing Oil Burning Heaters, Furnaces, Floor Furnaces, Water Heaters.

This banner will help you. It's a national slogan for *dependable heat automatically controlled.* Ten million readers of National magazines will see it — and look for it in your store. DON'T let this selling opportunity go by. Use the banner on your heaters, windows, walls. Identify your store with the Dependable A-P Control and A-P AUTOMATIC COMFORT CONTROL.

Write us, or your heater manufacturer or distributor for these banners. They're free.

Now Rheem offers America's finest, most complete gas warm air heating line!

rely on Rheem

RHEEM MANUFACTURING COMPANY, 570 Lexington Ave., New York 22, N. Y. • Regional Offices: 4301 Firestone Blvd., South Gate, California • 1025 Lockwood Drive, Houston 26, Texas • 7000 S. Kedzie Ave., Chicago 29, Illinois • 29-20 41st Ave., Long Island City 1, New York • Spartanburg Point 19, Maryland

Tri-Flex . . . Aerovane

. . in the Crowell-Collier Building

Styled in the best traditions of contemporary architecture . . . designed throughout for utmost efficiency . . . this modern home of the world-known publishers of *Colliers, Woman's Home Companion,* and *The American Magazine* is the latest addition to the New York skyline . . . and like so many other important air conditioned installations from coast to coast, Tri-Flex and Aerovane Grilles and Registers were selected to insure maximum, flexible control of air delivery . . . to meet the most exacting requirements of performance.

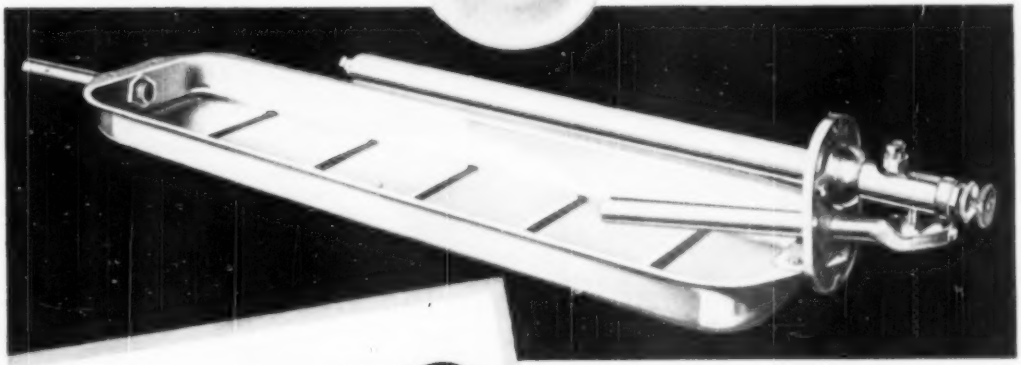
STARRETT BROTHERS & EKEN
Builders

LEONARD SCHULTZE & ASSOCIATES
Architects

ALVORD & SWIFT
Heating and Air Conditioning Contractors

TUTTLE & BAILEY INC
NEW BRITAIN, CONNECTICUT

EACH DROP OF WATER VAPORIZES AS IT STRIKES HEATED PAN!



THERMO DRIP *Automatic* HUMIDIFIER

Water drips—*AT PRE-SELECTED SPEED*—into fast-heating, stainless steel pan. Drip feed principle gives almost immediate vaporization—makes a much more efficient working humidifier.

There is never a stagnant pool of water to reheat before vaporization begins—only a thin film of water ever forms in pan.

These features assure superior performance at LESS COST.

SUPER-SENSITIVE THERMOSTAT
Fool-proof. Starts or stops the flow of water according to bonnet temperature.

OUTSIDE SCREW ADJUSTER
Easy to regulate. Fingertip control.

12 PAN SIZES
Installs quickly—easily in every type warm air furnace.

1 KIT TO PURCHASE
NEW, IMPROVED AIR-TIGHT VALVE ORIFICE
Has positive seating action.

DRIP FEED PRINCIPLE
Water does not spray or run—Passes through funneled orifice.

Write TODAY for free literature. Dept. A-120

Automatic Humidifier Co. CEDAR FALLS, IOWA

How to save MOST in assembly

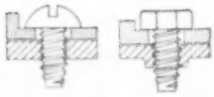
Every experienced sheet metal man knows he can cut assembly costs —in the shop and on the job—with hardened Sheet Metal Screws.

But *how much* you save depends on the performance of the screws. The time-saving you normally expect can be quickly reduced to zero if heads pop off, if you can't seat the screws properly because they are not threaded right up to the head, if they are too soft.

That's why most sheet metal men insist on P-K Screws. Old-timers remember when Parker-Kalon pioneered the Type A Sheet Metal Screw 35 years ago. They know that hardness and toughness are properly balanced in every screw, —that threads are sharp and clean from the head to the gimlet point.

Start making the top savings you've been missing. Find out why the best sheet metal craftsmen always say, "If it's P-K*... it's O.K!"

Sold through accredited Distributors



FOR HEAVY SHEET METAL WORK

Use P-K Type "Z" for sheet metal .050" to .200" thick. For sheets or plates over .200" thick, use the heavy duty Hex Head Type "Z". For stainless installation in dairies, laboratories, hotel kitchens, etc., use Type "Z" made of 18-8 Stainless steel. SAMPLES free. Just tell us what you are fastening. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y.

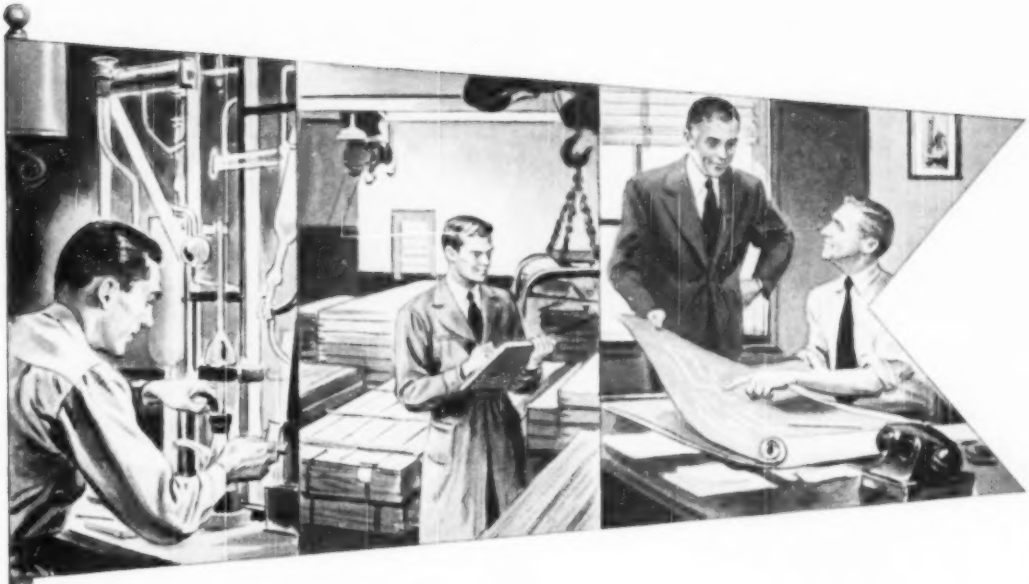
*TRADE MARKS REG. U.S. PAT. OFF.

P-K TRADE MARK

The Original

PARKER-KALON* SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY



It's your team

Why not use it and profit by it?

When you use the services of your Armco Distributor, you join a team that can help you *save* money and *make* money on stainless sheet metal installations.

The "first-string" members of this team are the Armco Distributor and his experienced salesmen. Counseling with Armco Metallurgists, they can give you sound recommendations on the type, grade and finish of stainless steel you need to handle any job efficiently—and profitably.

They can provide helpful advice on fabricating, too—in person and through such valuable booklets as Armco's fully illustrated shop manual, "Stainless Fabricating Tips."

On the same team with the Armco Distributor, of course, are the vast research and production facilities of Armco Steel Corporation. And a 36-year-old national advertising program that supports your sales efforts.

So remember, the next time you need service on stainless steel, get in touch with the nearby Armco Distributor. If you don't know his name, all you have to do is drop a post card to the address below.

50th ANNIVERSARY
SPECIAL PURPOSE STEELS

ARMCO STEEL CORPORATION

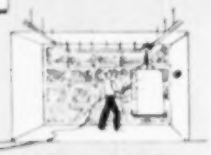
650 CURTIS STREET, MIDDLETOWN, OHIO, WITH PLANTS AND SALES OFFICES FROM COAST TO COAST • THE ARMCO INTERNATIONAL CORPORATION, WORLD-WIDE

ARMCO

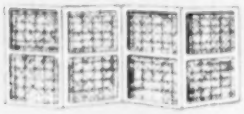
THERE'S AN RP *Air Filter for:*

FORCED WARM AIR FURNACES

UNIT AIR CONDITIONERS



PAINT SPRAY BOOTH



CENTRAL SYSTEM FILTER BANKS

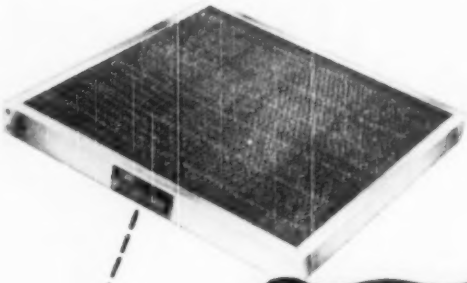
KITCHEN GREASE CANOPIES

ENGINE INTAKE

SPECIAL PURPOSE DESIGNS

Tell us your Air Filter needs and specifications

Your Profits Stay Up with this Year-'round Item!



R-P GREASE FILTER

Any place where commercial cooking is done, is a place where you can find patented grease filter customers. Profits from sales and installation of these gleaming aluminum Grease Filters can be yours, starting now.

BECAUSE —

FIRE HAZARDS ARE ELIMINATED — R-P Grease Filters catch and hold 98% of the highly inflammable vapors that ordinarily collect in flues and ducts.

SANITATION IS IMPROVED Dirty Grease does not collect and drip into deep fryers, ranges and ovens when R-P Grease Filters are on the job.

EXPENSES REDUCED Expensive cleaning of greasy kitchen exhaust flues is eliminated. R-P Grease Filters prevent gummed-up kitchen fan motors, eliminates costly repair jobs and increase motor efficiency.

KITCHEN APPEARANCE IMPROVED Any canopy in any kitchen looks better when these modern Grease Filters are installed.

FOR PROFIT PLAN . . . .

Write RESEARCH PRODUCTS CORP., Madison, Wis., U. S. A.

RP . . . PRODUCTS OF RESEARCH

WASHABLE AND REPLACEMENT AIR FILTERS • GREASE FILTERS
EVAPORATIVE COOLER MATERIALS

STOCK UP NOW ON THE MOST AMAZING NEW REGISTER IN MODERN HEATING HISTORY!

Simple to operate! Easy for housewife to balance heat in every room!

Perfect draft-free air diffusion without "whistling"!

NEW! "BALANCING BELL"* CONTROL eliminates quadrant dampers . . . simplifies balancing . . . slashes service calls!

NEW! TRIM, SMART APPEARANCE from *any* angle! Smooth, one-piece face with horizontal louvers . . . no solid center strip or mullion . . . electrostatically painted—finish beautiful by itself, a perfect base for harmonizing finish!

NEW! SUPER STRENGTH—vertical diffusion blades individually *resistance-welded* to face louvers . . . *die-formed* valve hinge . . . rounded corners . . . angle pieces *jig-welded* to back side of face!

NEW! INDIVIDUALLY PACKAGED in attractive cardboard envelopes, with specifications printed on end flaps!

ALL THESE NEW, EXCLUSIVE FEATURES AT NO MORE COST THAN ORDINARY REGISTERS!

ORDER TODAY! IMMEDIATE SHIPMENT OF ALL SIZES ANY QUANTITIES!

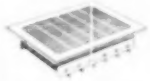
*Patent Applied For

Lima

"WORLD'S FINEST REGISTER"

COMPLETE LINE OF LIMA FLOOR REGISTERS!

With smash-welded corners, welded steel grids and frames for greatest strength! Finished in handsome *Duragold* that harmonizes with all floor finishes, lasts through many years of rugged wear! All sizes! Oak-grain finish also available.



See your regular jobber or write for name of your nearest Lima jobber.

THE Lima REGISTER COMPANY
LIMA, OHIO

SEND COUPON FOR FREE DESCRIPTIVE MATERIAL!

LIMA REGISTER COMPANY AA 12/50
651 N. Baxter Street, Lima, Ohio

Gentlemen: Please send me free descriptive material on the complete line of Lima registers and faces for installation in walls, baseboards and floors.

Name _____

Address _____

City _____ *Zone* _____ *State* _____

Front view Wysong No. 10-10
Capacity 10 foot, 10 gauge, mild steel.

Buy Wysong!

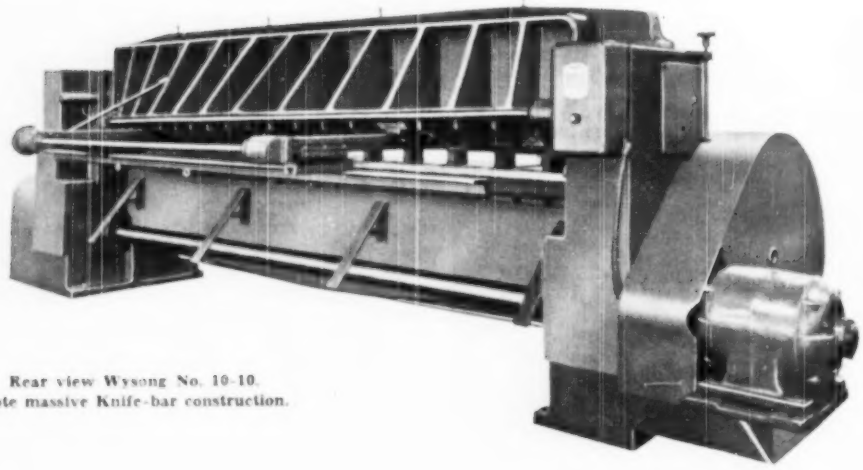
FOR TOP SHEAR VALUE

Time tested rigid construction that stands up under constant usage. Labor saving features for quick and easy positioning of stock. Shearing is fast, safe and accurate. Each shear is shipped completely equipped and ready for capacity operation. Compare Wysong, feature for feature. Then Buy Wysong.

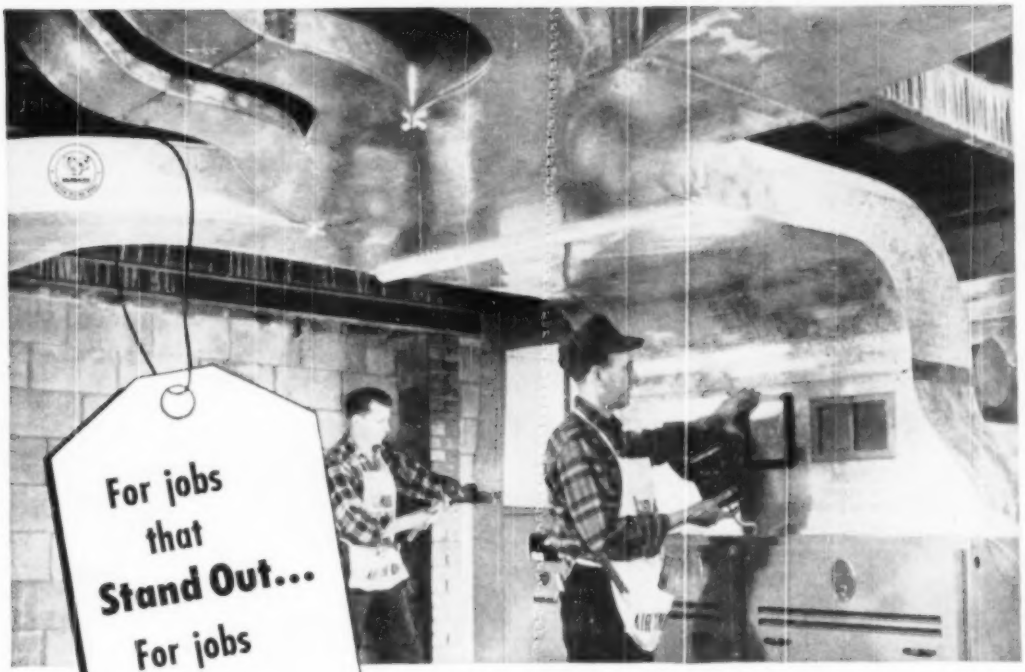
See your dealer or write for catalog No. 44. Wysong builds a complete line of Air, Foot and Motor powered squaring shears for the sheet metal fabricator.

WYSONG and MILES Co

GREENSBORO, NORTH CAROLINA



Rear view Wysong No. 10-10.
Note massive Knife-bar construction.



For jobs that Stand Out... For jobs that Stand Up...

U·S·S Galvanized Sheets

THE better the material, the better the job! This familiar axiom certainly applies to sheet metal work.

Take the interior ductwork shown above, for example. Fabricated from U·S·S Galvanized Steel Sheets, it is about as neat and good-looking as any you're likely to see anywhere! Yet, you or any other skilled craftsman can easily turn out jobs just as smooth and satisfactory. But you can't obtain such results unless the sheets you use possess good forming characteristics.

That's why it will pay you to use U·S·S Galvanized Sheets. You can be sure of their quality. You can depend on their being uniform in surface, flatness and ductility. Their superior forming qualities will enable you to form difficult shapes and angles easily and accurately. You'll find that tight neat seams can be readily obtained with soldered, cemented or riveted joints. And, these superior sheets can be rolled, bent, cut and stamped with equally fine results.

When you need sheets, ask your supplier for those bearing the famous U·S·S trade-mark. You can't find better sheets at any price anywhere!

To stand up under severe atmospheric conditions

U·S·S GALVANIZED COPPER STEEL SHEETS

— give extra atmospheric corrosion resistance at little additional cost!

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH • COLUMBIA STEEL COMPANY, SAN FRANCISCO • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

GALVANIZED STEEL SHEETS

UNITED STATES STEEL

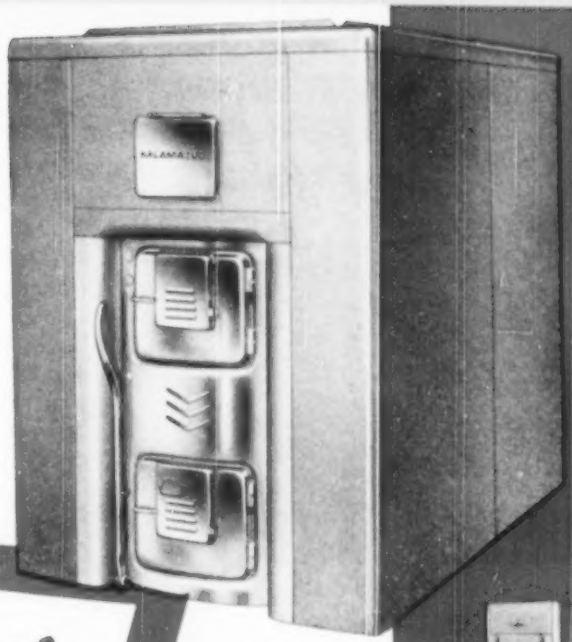
Belief in the trade name—confidence in products carrying that name—that's what draws customers into a Kalamazoo Dealer's store.

For 49 years Kalamazoo quality and value have been building up this belief and confidence.

It's this Kalamazoo reputation for honest quality that brings customers in—sells them faster—and rewards Kalamazoo Dealers with more profits!

This life-time investment in good heating will bring buyers in—look at its advantages!

- Can be converted to burn oil or gas
- Giant full-circle radiator provides as much as 21% greater heating surface
- 10% more efficient than other comparable furnaces
- Eliminates down draft in radiator
- Straight-sided firepot (for maximum grate expanse) and giant steel drum assure thorough fuel combustion



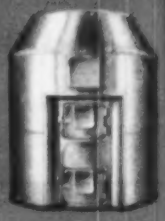
Famous Supersteel 3 Fuel

Winter Air Conditioner

- Built of special, heavy-duty Kalamazoo steel with electric-welded, leakproof joints stronger than the metal itself
- Hot blast pre-heats air so gases burn completely
- Heavy, oversize all-fuel grate lasts and lasts
- Exclusive "triple-clinch" permanently joins drum and radiator
- Firepot lining is 1½-in. thick firebrick—same high quality as industrial blast furnaces
- Automatic controls, automatic humidifier
- Trouble-free blower operates silently, efficiently—delivers filtered, conditioned air to every room

Besides this famous Supersteel 3-Fuel Winter Air Conditioner, the Kalamazoo Heating Equipment Line includes: 3-Fuel Gravity Furnaces, Oil Conversion Burners, Gas Conversion Burners, Stokers, Blowers, Filters, Registers, Fittings, and a full range of Automatic Controls. THE KALAMAZOO STOVE & FURNACE CO., 455 Rochester Avenue, Kalamazoo, Michigan

Kalamazoo Oil or Gas Convertible Warm Air Conditioners



Kalamazoo 3-Fuel Gravity Furnaces

Kalamazoo Gas Gravity Furnaces

HOME APPLIANCES
KALAMAZOO
HEATING EQUIPMENT

There's a SUNDSTRAND Service Station close at hand ...to give you quick, dependable service when you need it!

SUNDSTRAND FUEL UNITS

SUNDSTRAND MACHINE TOOL CO.

HYDRAULIC DIVISION, ROCKFORD, ILL.

SUNDSTRAND WORLDWIDE SERVICE NETWORK...

ALABAMA
Hinkle Supply Co., Inc.
2922 Fifth Ave. South, Birmingham

COLORADO
Hoico Company, Inc.
4947 Colorado Blvd., Denver, 16

CONNECTICUT
Bell Pump Service Co.
44 New Britain Ave., Hartford, 6
Bell Pump Service Co.
750 Congress Ave., New Haven
Sid Harvey, Inc.
1625 Stratford Ave., Bridgeport

ILLINOIS
Robert Barclay, Inc.
122 North Peoria St., Chicago, 7
W. C. Morse
4629 West End Ave., Chicago, 44
North Shore Heating Supply Co.
006 Gea St., Winnetka
Oil Heat Parts Service
608 Lafayette Ave., Rockford
C. E. Sandberg Co.
615 W. 79th St., Chicago, 20

INDIANA
G. W. Berkheimer Co., Inc.
1040 Washington St., Gary

IOWA
Industrial Engineering Equip. Co.
122-124 East Fourth St., Davenport
Thermal Company, Inc.
106 Eleventh St., Des Moines, 9

MAINE
Refrigeration & Oil Burner Supply Company
133 Marginal Way, Portland, 3

MARYLAND
Sid Harvey of Md., Inc.
619 W. North Ave., Baltimore
R. E. Michel Company
1011 Greenmount Ave., Baltimore

MASSACHUSETTS
Acme Heating Supply, Co.
112 Summer St., Lynn
Bell Pump Service Co.
888 Main St., Springfield
Cronin Supply Company
60 Broadway, Cambridge
Sid Harvey of Mass., Inc.
566 Cambridge St., Allston Station, Boston 34
E. L. Kimball Company
1256 Eastern Ave., Malden
Oil Heating Supply Co.
8 Cedar St., Framingham
W. S. Plummer
109 Lincoln Ave., Quincy

MICHIGAN
R. L. Deppmann Company
5851 Hamilton Ave., Detroit
R. L. Deppmann Company
1516 Wealthy St., S. E., Grand Rapids
Hydraulics & Pump Repair Co.
133 W. Seven Mile, Detroit
Patton Distributing Co.
7125-7127 Freeman Ave., Detroit, 4

MINNESOTA
Thermal Company, Inc.
2526 University Ave., St. Paul

MISSOURI
Crescent Parts & Equip. Co., Inc.
825-831 S. Hoyle Ave., St. Louis, 10
Superior Supply
1326-28 Walnut St., Kansas City

NEBRASKA
Dennis Supply
2417 Douglas, Omaha

NEW JERSEY
Certified Fuel Unit Service
808 Spring St., Elizabeth
Certified Fuel Unit Service
P. O. Box 136, Merchantville
Certified Fuel Unit Service
671-3 Lanford Ave., Newark
Sid Harvey of N. J., Inc.
150 Lindley Ave., Newark, 6
Sid Harvey of N. J., Inc.
1616 Bergenline Ave., Union City
Sid Harvey of N. J., Inc.
5 Prospect St., New Brunswick
Universal Engineering Co.
118 Wagaraw Road, Hawthorne

NEW YORK
Buffalo Pump Service Co.
440 South Bay Road, North Syracuse
The Caplain Company, Inc.
206 Rogers Ave., Brooklyn
The Caplain Company, Inc.
1014 Jericho Turnpike, New Hyde Park
The Caplain Company, Inc.
80-16 149th Place, Flushing
Certified Fuel Unit Service
1118 Central Ave., Albany
Frontier Oil Refining Corp.
367 Northampton St., Buffalo, 8
Sid Harvey, Inc.
138-76 Queens Blvd., Jamaica
Sid Harvey, Inc.
909 Main St., Boston Post Road, New Rochelle
Sid Harvey, Inc.
104 E. Mineola Ave., Valley Stream
Hanco Utilities Corp.
879 Tenth Ave., New York, 19
H & L Oil Burner Supply Co.
1077 Coney Island Ave., Brooklyn
H & L Oil Burner Supply Co.
1051 Pitkin St., East Hempstead, L. I.
H & L Oil Burner Supply Co.
208-17 Jamaica Ave., Queens Village, L. I.
Rochester Oil Burner Pump & Control Service
696 Swan St., Buffalo
Rochester Oil Burning System
198-204 North Clinton Ave., Rochester, 4
Standard Oil Burner Parts
202 S. Fulton Ave., Mt. Vernon

NORTH CAROLINA
Alley & Rader Services
P. O. Box 127, Burlington

OHIO
Ohio Pump Service Co.
7904 Lorain Ave., Cleveland, 2
F. E. Winstel Co.
1216-20 Race St., Cincinnati

OREGON
Industrial Control Co.
1418 E. Burnside St., Portland

PENNSYLVANIA
Certified Fuel Unit Service
1417 W. Allegheny Ave., Philadelphia
Sid Harvey of Pa., Inc.
715 S. 50th St., Philadelphia, 43
Sid Harvey of Pa., Inc.
511 W. Lindley Ave., Philadelphia, 20

RHODE ISLAND
R. I. Fuel Pump Service Co.
847 North Main St., Providence, 4

UTAH
Inter Mountain Oil Burner Supply Co.
4045 So. State St., Murray

VIRGINIA
R. E. Michel Company
514 S. Pine St., Richmond
Refrigeration Suppliers, Inc.
633 W. 24th St., Norfolk, 10

WASHINGTON, D. C.
Sid Harvey of Md., Inc.
347 Cedar St., N. W., Washington, 12
R. E. Michel Company
1320 1st St. N. E., Washington

WASHINGTON
Instrument Laboratory, Inc.
934 Elliott Ave. West, Seattle, 99

WISCONSIN
Refrigeration Parts Co., Inc.
2532-34 West Fond du Lac Ave., Milwaukee, 6

FOREIGN

CANADA & BRITISH DOMINION
John Inglis Co. Limited
14 Strachan Ave., Toronto 1, Ontario

FRANCE
R. S. Stokvis et Fils, S. A.
20-22, Rue Des Petits Hotels, Paris, France

HOLLAND, BELGIUM, LUXEMBOURG & SWITZERLAND
Langland Rotterdam
N. V. Industrie - En Handelmaatschappij
Parkstraat 70, Rotterdam, Holland

SWEDEN, NORWAY, DENMARK & FINLAND
Angio Nordic Motor & Electric Ltd. A. B.
Stalegatan 5, Stockholm, Sweden

Choose from America's Greatest Truck Values!

CHEVROLET ADVANCE-DESIGN TRUCKS

You're right in every way when you choose Chevrolet trucks as your on-the-job partners. Chevrolet offers you more—in power for the job, economy of operation, low maintenance costs.

Economy-wise—you're right in choosing Chevrolet. You save money, for Chevrolet is the lowest priced line of all. And you save on gas, oil and upkeep with these trucks so famous for all-around economy.

Power-wise—you get more with Chevrolet, too. Chevrolet's great valve-in-head engine is the result of 38 years of steady improvement—an engine that offers outstanding pulling power combined with dependability and long service at low cost.

Job-wise—you're right with Chevrolet. There's a Chevrolet truck to fit *your* job . . . with the right power, the right clutch, the right power-train to fit the need. And every unit of the Chevrolet truck you select is *engineered* for the job. Yes, to *do* your job right—with outstanding efficiency and economy.

Before you buy, get all the facts on Chevrolet—first-cost, operating cost and maintenance cost. Remember: For the last eight consecutive truck production years, users have purchased more Chevrolet trucks than any other make. See your local Chevrolet dealer now!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

CHEVROLET

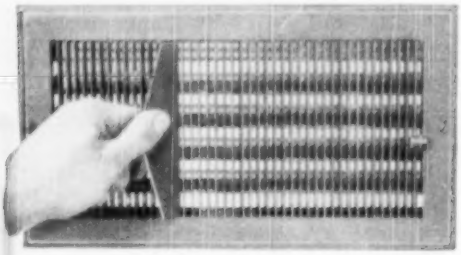
First in demand
First in value
First in sales

Only Chevrolet Trucks Give You All These Advance-Design Features:

• TWO GREAT VALVE-IN-HEAD ENGINES: the 105-h.p. Loadmaster or the improved 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—for dependability and long life • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—for greater load protection • ADVANCE-DESIGN STYLING for increased comfort and modern appearance.

THREE WINNERS!
in Home Forced-Air Heating!

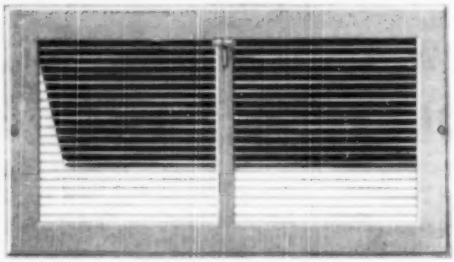
Every register need for forced air heating — from the finest residential "palace" to the conversion installations for old homes — is provided for you in the complete U. S. line.



1 No. 256 4-WAY-FLOW AIR-CONDITIONING REGISTER

This is the incomparable register for those top-grade jobs where four-directional flow and multiple valve control are indicated. U. S. No. 256 can be installed in any location — sidewall or ceiling — with any style stackhead. It helps build your reputation for efficient heating and careful workmanship.

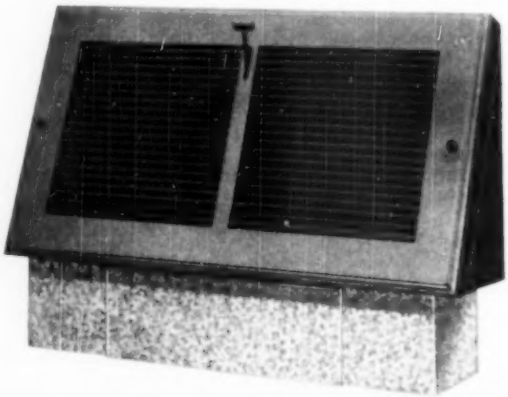
2 No. 153 SINGLE VALVE REGISTER



Where customers want quality appearance but low cost is also important, recommend U. S. No. 153. It is neat and trim — the best constructed single valve register in the industry.

3 No. 165 3-¾" Out-Of-Wall AIR-CONDITIONING REGISTER
(Developed For Perimeter Heating)

This is the perfect solution for adding a blower unit to old house heating systems without cutting into floors, walls, girders, or carpets. Stackhead sets against wall when studding space is not available. Can be supplied with or without heads. We advise ordering complete with heads. Matching cold air returns are U. S. No. 175 3-¾" Out-Of-Wall intakes.



Send for New No. 51 Catalog

UNITED STATES REGISTER COMPANY
BATTLE CREEK, MICHIGAN
MINNEAPOLIS • KANSAS CITY • ALBANY
SOLD BY LEADING JOBBERS FROM COAST TO COAST

Here's Your Answer to

HOUSING PROJECT INSTALLATIONS

"We're Cutting Costs with Char-Gale Project Packs"

All the fittings needed for each job "CUSTOM PACKED" to your specifications

READY FOR FINAL ASSEMBLY

Project Packs provide these advantages...

Help in figuring costs

You can determine your bids quickly and accurately, when you use Char-Gale Project Packs. No forgotten costs will creep in.

Savings on material

Char-Gale Project Packs are made up to your specifications. You get everything you need for the job, without any waste.

Savings on handling and storage

Compact cartons provide a flexible storage system, eliminating outmoded bins, wasted space. No sorting and resorting, either.

Savings in time

"On the way" or "on the job", you save time with Project Packs. All fittings are in the carton, ready for quick, final assembly.

Assurance that you can finish the job

In these days of sheet metal shortages, it's good to know that you won't be caught short. Start, *and finish*, with Char-Gale.

From every angle, Char-Gale Project Packs are your answer to housing project installations. If you have not yet investigated the possibilities of Char-Gale's Packaging Program, do so today!

Write, Wire or Phone Us—Or ask your Jobber

CHAR-GALE MANUFACTURING CO.

MINNEAPOLIS-OMAHA

Mr. M. Hochede, General Manager
New Mission Heating & Ventilating Co.
San Francisco, Calif.

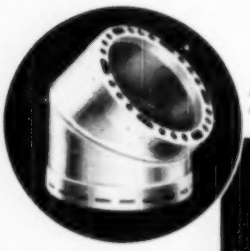
"SUBSTANTIAL SAVINGS"

with

QC METALBESTOS

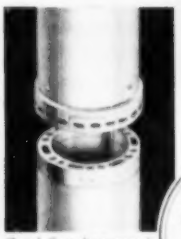
GAS VENT

reported by San Francisco contractor.



Adjustable Elbows simplify installation

Adjustable length eliminates cutting and fitting



Quick Coupling speeds assembly

Mr. M. Hochede, General Manager of the New Mission Heating & Ventilating Company, having recently completed work on a large housing project, has this to say about Metalbestos Gas Vent Pipe:

"When QC Metalbestos was first manufactured by the William Wallace Company, we could see that there would be a substantial saving in labor increasing our profits and enabling us to do more work with the same amount of men. As one of the most vital things in any business is labor, we were quick to adopt this new product."

LOWER INSTALLATION COSTS were possible because lightweight self-aligning sections go quickly into place. No special tools or skills needed. Adjustable lengths and versatile fittings eliminate costly cutting and special fabrication . . . keep labor costs to a minimum.

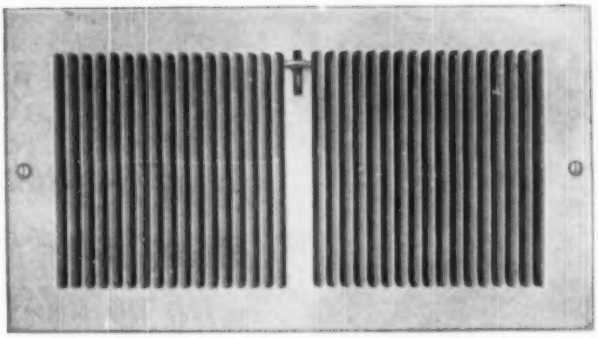
Order from your jobber or write to Dept. B

Metalbestos Gas Vent pipe meets all safety requirements of the Underwriter's Laboratories for Type B Gas Vents

METALBESTOS DIVISION

WILLIAM WALLACE COMPANY · BELMONT, CALIF.

For Right or Left, or for Up or Down Direction — use these Fine Quality



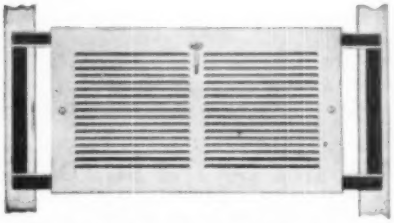
No. 4032

AIRO-FLEX

Single Valve Adjustable Registers

Use Slide Frames!

Here is an item that is a favorite with many contractors—the Auer adjustable runner slide frame. Saves you real time and money on your register installations. Provides quick and ideal means of attaching register to stackhead. You do not have to frame or block in around opening. Just attach frame to stud with four nails and you get a register installation which is rigid and level. Furnished as an extra for any Auer air conditioning register. When ordering, specify whether for base or wall. Assembly shown below is Auer Airo-Flex No. 7010 wall register.



The Airo-Flex "4000" Series, shown above, with vertical adjustable fins, is for sideway directional flow. For your forced air or air conditioning jobs, where single or 2-way lateral deflection is desired, this moderate priced, top quality design, in both appearance and efficiency, may well be classed with more expensive registers. It has single valve, operated by exclusive, patented spring tension device, permanently positive. Fins are bendable on the job (set when shipped at 22°, half left, half right). This "4000" Series is unusually neat and substantial in construction, well turned out and finished, a credit to any job. Available in usual wall or baseboard models, also intakes. The same type register for up-or-down deflection, in the "7000" Series, is shown below.

Auer makes a complete line of modern and attractive floor, base, and wall registers and return faces—designed and styled by experts—for gravity or air conditioning, including all directional types. We also supply perforated metal grilles, in all materials and sizes, for ventilation, concealment, enclosure or other purposes. For high velocity outlets, ask for Bulletin S-49 on "Streamliner" registers and grilles. Genuine Auer Registers are made *only* by The Auer Register Co.

Ask for Auer Register Book—or special Grille Catalog "G".

THE AUER REGISTER CO., 6600 CLEMENT AVENUE, CLEVELAND 5, OHIO

CANADIAN DISTRIBUTOR, MARCHAND FURNACE, LTD., TILBURY, ONT.

Auer **REGISTERS**

& GRILLES *for* AIR CONDITIONING & GRAVITY

Perry E. Miller, President of Industrial Roofing and Sheet Metal, Inc., Cleveland, Ohio. For a lasting job, Mr. Miller's firm uses Monel Roofing Sheet.

Take it from Perry E. Miller...

"Replacing these batten pans with Monel gave a first quality roof with no added time or labor..."

Orrin Lau, Vice-President of Industrial Roofing and Sheet Metal, Inc., inspects Monel batten pans, of the Overly "Goodwin Type", recently installed by his firm.

For batten pan replacements and other roofing jobs, seasoned workers prefer Monel Roofing Sheet. They find Monel easy to work, requiring no extra tools.

Perry E. Miller knows the advantages of Monel® Roofing Sheet and has already made certain his company will be recognized as leading Monel roofers in his area.

As President of Industrial Roofing and Sheet Metal, Inc., of Cleveland, Ohio, Mr. Miller can speak of Monel roofing from his own well-considered judgment.

"Consider one job we did recently, just outside Cleveland," says Mr. Miller. "The old batten pans had failed. By fabricating the new ones of Monel, we could give the customer positive assurance of first quality roofing. The Monel should give satisfactory service as long as the building will last. And from our point of view, too, as contractor, Monel means no extra time, labor, or trouble in fabrication."

Wherever buildings need roof "decks," leaders, valleys, flashings, gutters, downspouts, sky-light frames, ventilators, or louvers, Monel transforms the ordinary contract to a roofer's "show-piece." Though other jobs may be forgotten, the Monel roofer's work can stand scrutiny at any time, a recommendation for future work.

The reasons? Monel roofing sheet is strong and tough. Yet you can cut it easily. You can bend it to intricate shapes. You can solder it into a good, strong, weatherproof job.

And the special reason it is weatherproof? Because Monel resists atmospheric corrosion. It stands up under impact, abrasion, and repeated flexing.

Though all metals are in short supply today, and substitutes may have to be used, Monel roofers, like Perry E. Miller, can always point with justified pride to their Monel installations. It is these that will last in years to come... and will be the source of new Monel jobs when metal is again readily available.

We have prepared two helpful bulletins, "Monel Roofing Sheet—Basic Application Data" and "The Soft Soldering of Monel Sheet." Use them to answer customers' questions, or to give your men useful hints regarding Monel installation.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

MONEL... FOR THE LIFE OF THE BUILDING

Get copies of these free booklets

Just fill in and mail the coupon

Architectural Section
The International Nickel Company, Inc.
67 Wall Street, New York 5, N. Y.
Please send me free copies of:
☐ "Monel Roofing Sheet—Basic Application Data"
☐ "The Soft Soldering of Monel Sheet"

Name _____
Address _____
City _____ Zone _____ State _____

AA 1-50

News Round-Up

August Furnace Shipments

SHIPMENTS OF WARM AIR FURNACES hit a new peak in the month of August when there were 116,635 units shipped. This figure brought total shipments for the first 8 months of 1950 to 629,995, compared to 372,036 furnaces shipped in the first 8 months of 1949. There were only 84,250 units shipped in August 1949. These figures have been compiled by the Bureau of the Census, Department of Commerce.

A classification of August shipments by types of fuel shows the following percentages: coal fired units, 23,405 or 16 per cent; oil fired units, 45,644 or 41 per cent; gas fired units, 54,318 or 53 per cent.

Automatic heating totaled 84 per cent of the shipments and forced air furnaces made up 74 per cent of the shipments.

There were 135,088 residential type oil burners shipped during the month of August 1950, compared to 71,472 during the month of August 1949. This brought shipments for the first 8 months of 1950 to 551,723 units against 284,381 during the same period last year.

September Steel Production

TOTAL PRODUCTION of steel for the month of September reached 8,193,194 tons, according to an announcement by the American Iron and Steel Institute. This represented 99.5 per cent of capacity.

Production for the year including September totals 71,601,553 tons or 95.9 per cent of capacity.

Heating Head Named

GEORGE T. UNDERWOOD has been named head of the new Plumbing and Heating Section of the Building Materials division of the National Production Authority. His duties will probably parallel those performed by Morgan Johnson during World War II.

Mr. Underwood has been an associate member of the American Society of Heating and Ventilating Engineers since 1944. Prior to his appointment with the NPA, he was serving as chief purchasing agent for the Federal Public Housing Authority.

Aluminum Production Up

PRODUCTION OF PRIMARY ALUMINUM in the United States during the third quarter of 1950 reached the highest level since the second quarter of 1944, according to Donald M. White, secretary of The Aluminum Association. But even with this high rate of production the industry is unable to supply all the metal desired by civilian users after meeting mounting military needs. The 371,945,713 pound total for the third quarter topped the year's second quarter production of 360,707,327 pounds by about 3 per cent.

Primary production during September was 118,298,413 pounds, more than 5 per cent below the 126,011,903 pounds for August, Mr. White reported. This was because September is a shorter month and because the strike which began in August in one of the production plants continued throughout September, he explained.

Sheet and plate shipments during the third quarter by member companies of the Aluminum Association totaled 314,239,096 pounds, up 16 per cent from the 271,157,929 pounds shipped during the second quarter. Shipments of these products were 109,770,305 pounds in September, 3.3 per cent below the 113,531,771 pounds for August.

Galvanized Sheet Production Down

THE ZINC SHORTAGE, aggravated by the government's stockpiling, has required Inland Steel Co. to cut back production of galvanized sheets, Hjalmar W. Johnson, vice president in charge of steel production, has announced. Zinc stocks are so low, Mr. Johnson said, that galvanizing operations must be geared to receipts of the metal with cuts varying, but reaching as much as 50 per cent of capacity operations.

Housing Starts Drop in October

THE NATION'S HOMEBUILDERS started 103,000 new permanent nonfarm dwelling units in October, according to preliminary estimates of the U. S. Labor Department's Bureau of Labor Statistics. This was a drop of 12,000 units, or 10 per cent, from September, but almost equaled the 104,300 unit volume for October 1949, when housing activity was at peak for that year.

October marked the first month this year than new housing volume was under the level of the corresponding month last year. The bureau stated that at this time the effect on housing starts of credit Regulation X and related curbs cannot be determined.

During the first 10 months of 1950, a total of 1,209,100

News Round-Up

new dwelling units were put under construction, 42 per cent above the 851,300 started during the same period last year. Of the 1950 aggregate, public housing accounted for 23,000 units, 30 per cent under the corresponding total for last year.

1951 Show Announced

THE 19th NATIONAL OIL HEAT EXPOSITION will be held at Navy Pier in Chicago, April 2, 3, 4, 5, 6, 1951. This news was released by the OHI show committee after returns were in from a questionnaire sent to all exhibitors in the 1950 Philadelphia exposition.

Due to the many comments on the questionnaire, the show committee followed the voters' decisions to "open the show earlier and close it earlier". Therefore, Show Open hours have been set as:

Monday	— April 2	4 to 10 p.m.	
Tuesday	" 3	4 to 10 p.m.	
Wednesday	" 4	4 to 10 p.m.	
Thursday	" 5	4 to 5 p.m.	(due to 23th annual OHI banquet)
Friday	" 6	4 to 8 p.m.	

News on space offerings will be sent out as soon as possible. The show builder has been hired and the OHI staff is busily working out details.

Mobile Laboratory Ready

THE NATIONAL WARM AIR HEATING and AIR CONDITIONING Association's new warm air heating mobile laboratory was introduced for the first time to members of the industry on October 12th.

The unveiling of the new mobile laboratory was made to the members of the association's Installation Codes Committee at Potowatomi Inn, Ind., during their annual fall meeting October 12 through 14.

W. D. Redrup, chairman of the Installation Codes Committee, with the aid of C. W. Nessell, chairman of the Field Investigation Committee, outlined the use to which the mobile laboratory would be placed, and explained the testing equipment carried in the laboratory. This equipment, consisting of the latest electronic recording devices available, will be used to test and check new applications of warm air heating already installed in houses throughout the country. The purpose of this program is to assemble as rapidly as possible for the industry, the design and installation standards for the newer types of warm air heating installations.

Although the operation of the truck will come under the supervision of the Field Investigation Committee, the information obtained from the survey will go to the Installation Codes Committee. Under their guidance, the results of the tests will be carefully analyzed and evaluated. In those cases where it is found that new applications provide satisfactory heating comfort, design and installation manuals will be prepared by the committee for distribution to the industry.

"Through the effort of the Field Investigation Committee enough information has already been uncovered to warrant the publishing of a new revised edition of Manual 4 on perimeter heating," stated Mr. Redrup. This new edition will include recommended design and installation guides for other types of warm air heating systems for basementless houses, and should be ready for distribution within several months. Included in the new Manual 4 will be a recommended procedure for heating houses built over crawl space.

September Furnace Shipments

SHIPMENTS OF WARM AIR FURNACES during the month of September reached a total of 139,014 units. This brought the shipments for the first 9 months of 1950 to 767,866. The latter total compares to 853,618 units shipped in the first 9 months of 1949. There were 111,582 warm air furnaces shipped during the month of September 1949. These figures have been compiled by the Bureau of the Census, Department of Commerce.

September shipments classified according to fuel show the following percentages: coal fired units, 19,793 or 14 per cent; oil fired units, 44,930 or 32 per cent; gas fired units, 74,241 or 54 per cent.

Automatic heating accounted for 86 per cent of the shipments.

Forced air furnaces totaled 106,098 or 76 per cent; gravity units, 32,916 or 24 per cent.

There were 111,304 residential type oil burners shipped during September compared to 92,025 in September 1949. Total oil burner shipments for 1950 to the end of September equalled 646,365; in the same period in 1949 there were 376,404 burners shipped.

Research Men Nominated

THE AMERICAN SOCIETY of Heating and Ventilating Engineers has announced five nominations to the Committee on Research, which directs the society's research program at its laboratory in Cleveland, Ohio, and at cooperating universities and colleges. If elected by the ASHVE membership, the men will serve for three years,

succeeding those members whose present terms expire January, 1951.

Named by the Council, governing body of the society, the nominees are: Prof. A. B. Algren, head, division of heating, ventilating, air conditioning and refrigeration, Department of Mechanical Engineering, University of Minnesota; John Everetts, Jr., consulting engineer, Charles S. Leopold, Philadelphia; T. H. Smoot, director of research, Lennox Furnace Co., Marshalltown, Ia.; T. A. Walters, director of research, American Blower Corp., Detroit, and W. N. Witheridge, ventilation consultant, General Motors Corp., Detroit.

Voting will be by letter-ballot of the ASHVE membership which totals 8,250. Results of the vote will be announced at the society's 57th annual meeting in Philadelphia, Jan. 22-25, 1951. R. C. Cross, assistant manager, Merchandise Testing and Development Laboratories, Sears, Roebuck & Co., Chicago, is chairman of the Committee on Research, and Richard S. Dill, chief of the Heating and Air Conditioning Section, National Bureau of Standards, Wash., D. C., is vice chairman.

Defense Orders

REGULATION 2 (Interpretation 1, Oct. 20, 1950)—Department of Defense and the Atomic Energy Commission may assign to their suppliers of petroleum and food the right to apply DO ratings: 1) To secure the drums, cans and other containers and packaging required for the delivery of petroleum and food; 2) To secure chemicals required for use, either directly in the production of, or in processing the petroleum and food and which will be consumed or converted into by-products in the course of the processing.

M-1 (Amendment, Oct. 26, 1950)—Sets forth specific rules for placing, accepting and scheduling of orders for steel products. NPA will from time to time approve scheduled programs calling for the production and delivery of steel products for stated purposes, over specified periods of time. Upon approval of major programs of this type, supplements will be issued describing such programs and specifying the manner in which they are to be carried out by the steel industry.

M-1 (Supplement 1, Oct. 26, 1950)—Purpose to provide steel products in sufficient quantities during the first quarter of 1951 to manufacture new freight cars at the rate of 10,000 cars a month. Will provide approximately 310,000 tons of steel products per month to car builders and repair shops during first quarter, 1951.

M-2 (Nov. 1, 1950)—Revised rubber order specifically limiting the use of natural rubber during November and December 1950. Principal provisions: 1) Places specific limits on both total new, as well as total natural rubber, which rubber users may consume during November and December of this year; 2) Limits consumption of natural rubber latex, and provides for set-aside of imported latex for the government stockpile; 3) Establishes procedures for formal NPA allocation of synthetic rubber produced in U. S. government plants.

M-3 (Oct. 19, 1950)—Reserves entire production and use of columbium bearing stainless steels for defense needs. Ferro-columbium and ferro-columbium tantalum, which are used for producing columbium stabilized stainless steels, are in short supply and required for the defense program. These alloys are used in high temperature combustion chambers and the processing of certain chemicals.

M-4 (Oct. 27, 1950)—Ban on construction of new buildings for amusement, recreational, or entertainment purposes. To conserve important materials, particularly certain metals in short supply, for national defense needs. Prohibited construction does not further the defense effort, either directly or indirectly, and does not increase the nation's productive capacity.

M-5 (Oct. 27, 1950)—Rules for handling defense orders for aluminum under the priorities system. Purpose is to maintain maximum aluminum output by providing for equitable distribution of defense orders among aluminum producers, fabricators, distributors, and jobbers. Provides a 60 day lead time in the scheduling of defense orders by stating that no aluminum producers and fabricators are required to accept defense rated (DO) orders received less than 60 days before the first day of the month in which shipment is requested.

DELEGATION 1 (Amended, Nov. 1, 1950)—Amendment designed to provide a method for meeting requirements of programs intimately connected with national defense, but where procurement is not made directly by the Department of Defense. Department of Defense may now assign ratings for authorized programs of such other U. S. government agencies as NPA may designate.

DELEGATION 2 (Amended, Nov. 2, 1950)—Broadens delegation of priorities authority to the Atomic Energy Commission to permit use of DO priorities ratings for certain plants serving the AEC but not owned or operated by that agency.

REGULATION 3 (Nov. 8, 1950)—Implements joint priorities systems between the United States and Canada. Provides specific methods of carrying out the provisions of the Statement of Principles for Economic Cooperation issued Oct. 26, 1950, by the governments of the United States and Canada. The statement of principles agreed upon the mutual need for a coordinated program of requirements, production, procurement, and controls in order to achieve maximum production of products for the common defense.

Warehouse Stocks Assured

M-6 (Nov. 8, 1950)—Designed to insure stocks of steel products in steel warehouses. Purpose of the order is to establish regular allotments to warehouse concerns to supply small business firms dependent on them for their steel needs.

Warehouses will be expected, under this order which insures supplies to them, to continue the proportionate

pattern of distribution to recognized customers by products and quantities that has existed in the past.

The new order requires steel producers to allot to their warehouse customers proportionate percentages of each steel product, based on average monthly shipments during the first nine months of the year. These allotments will come out of the steel production available after the mills have filled defense requirements. Such allotments will be in addition to shipments made to steel warehouses to cover their defense rated orders.

M-7 (Nov. 13, 1950)—Reduces amount of aluminum available for civilian purposes. For the month of December 1950 users of aluminum are permitted to purchase 108 per cent of their average monthly consumption during the first 6 months of 1950.

During the first quarter of 1951 consumption will be limited to 65 per cent of the amount used during the first 6 months of 1950.

Reg. 1 (Interpretations 1, 2, and 3, Nov. 10, 1950)—Three interpretations of the inventory control regulation. The interpretations cover methods of adjusting orders, the extent of imported materials exemption, and deliveries of goods through intermediate distributors.

M-8 (Nov. 13, 1950)—Rules for reporting on inventories, receipts, consumption, import, and distribution of tin. Order limits inventories of alloys and other materials containing tin to 60 days' supply or a practicable working minimum.

M-4 (Amended, Oct. 31, 1950)—Changes policy of NPA in regard to future extension of construction ban. If further bans become necessary they will apply to commencement of buildings, not buildings actually under construction.

M-4 (Amended, Nov. 15, 1950)—Clarifies and extends ban on construction for amusement or entertainment purposes. Ban is applied to structures as well as buildings and now includes buildings where the principal business is the sale for consumption on the premises of alcoholic liquors.

M-4 (Supp. 2, Nov. 15, 1950)—Program to provide steel for Great Lakes cargo vessels. Approximately 10,000 tons of steel is to be made available by steel producers each month during the first quarter of 1951 for the construction of 12 new cargo vessels.

Reg. 2 (Amended, Nov. 16, 1950)—Excluded wood pulp from the NPA's basic priorities regulation.

M-9 (Nov. 16, 1950)—Rules for accepting and scheduling rated defense orders for zinc. Purpose is to provide for the equitable distribution of rated orders among all producers and fabricators of zinc. Producers and fabricators of zinc products are not required to accept DO orders received less than 30 days prior to the first day of the month in which shipment is required.

SMA Committee Formed

THE BOARD OF DIRECTORS of the Stoker Manufacturers Association meeting in Chicago on Monday, October 23rd established a special committee which will be known as the S. M. A.—Government Liaison Committee. C. T. Burg of Cleveland, Ohio, president of the association, stated the committee is being organized to act on behalf of the association, and the underfeed stoker industry on matters and problems concerning governmental regulations and legislation of all kinds, including relationships with the various and numerous new agencies operating under the Department of Defense and the National Security Resources Board.

The chairman of the committee is Claude A. Potts, immediate past president of the association, of Lebanon, Ind. and vice president, L. S. Machine Corp. The members are: E. A. Crawford, Detroit, Mich., vice president, Timken-Detroit Axle Co.; L. C. Dubs, Canton, Ohio, president, Canton Stoker Corp.; S. E. Dyke, Manheim, Penn., general manager, Hershey Machine and Foundry Co.; George W. Graham, Chicago, president, Eddy Stoker Corp.; Frank Hoke, Indianapolis, Ind., president, Holcomb & Hoke Mfg. Co.; J. M. McClintock, Chicago, manager, stoker division, Illinois Iron and Bolt Co.; C. P. Meredith, Springfield, Ohio, executive vice president, Steel Products Engineering Co.; C. T. Burg, Cleveland, Ohio, president, Iron Fireman Corp., and Marc G. Blith, Chicago, executive secretary of the association. The latter will act as secretary of the committee.

Utility Sales Hit

The United Counties Warm Air Heating Association, of Sharon, Penn., complained to the Public Utility Commission that the United Natural Gas Co., Oil City, "is engaging in unfair competition with private dealers in the sale of appliances."

The association, composed of dealers, asked the PUC to direct the utility to eliminate sale of gas appliances and confine its operations to the sale of gas.

The association contended that United's position as a public utility gives it an unfair competitive advantage over independent dealers.

C. F. Curtin Retires

C. F. CURTIN, secretary-treasurer of Oil-Heat Institute brought to an end 22 years of service to the oil heating industry when he retired at the end of October.

It was in 1928 that Neil Curtin first brought his experience with Sneony Burner and Timken to the fledgling Institute. The oil burner and fuel oil business was hardly an industry in those days, but rather a small, struggling group of men with a product short on public acceptance.

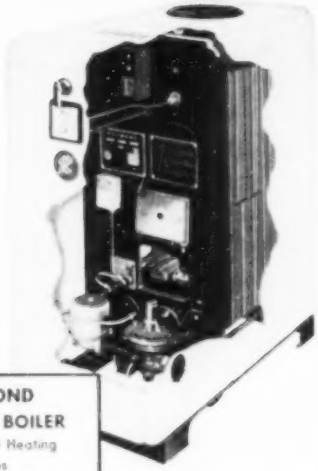
In 1941 Mr. Curtin was awarded the Aladdin's Lamp, the industry's highest honor, for meritorious service. The formation of commercial standards that came about through his persevering efforts was one of the highlights in his career, and he has managed the many sucessful oil burner shows and conventions that have taken place through the years.

The OHI board of directors, at their meeting on

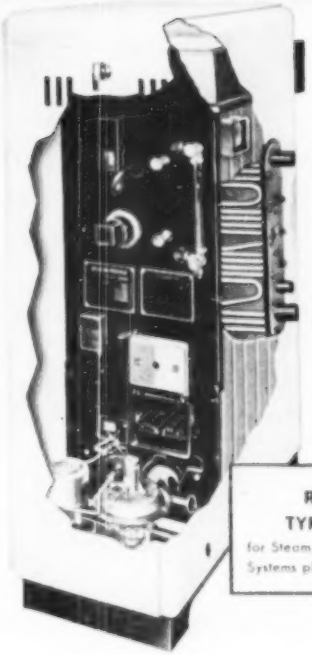
(Please turn to page 146)

Heat the house with RICHMOND...

CAST IRON...WET BASE...GAS FIRED BOILERS!



RICHMOND
TYPE WFD BOILER
for Hot Water Heating Systems



RICHMOND
TYPE K BOILER
for Steam, Vapor and Hot Water Systems plus Domestic Hot Water

- **WET BASE** ...prevents heat from radiating to floor; permits installation at radiator level.
- **REMOTE PILOT IGNITER** ...added safety and convenience feature . . . standard equipment with diaphragm gas valve controls for manufactured gas. Meets Eastern Utility requirements.
- **EASY CLEANOUT** ...top flue cleanout that saves disconnecting of piping and controls.
- **WHITE JACKET** ...baked white enamel casing of sturdy construction. Beautifully streamlined with smooth, rounded corners.
- **FIELD-PROVED** ... to give trouble-free performance with minimum service...Richmond Boilers are extra efficient due to their "wet base" design . . . economical for maintenance and installation.

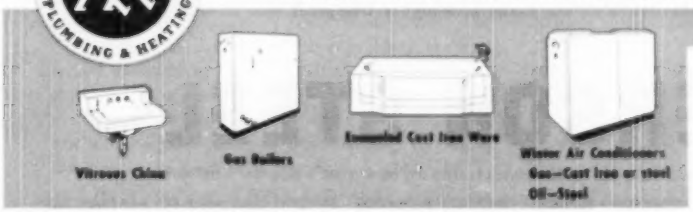
Consider together Richmond's improved design, construction and appearance and you know there are no better boilers to specify or install. AGA approved.

RICHMOND PLUMBING & HEATING

RICHMOND

RICHMOND RADIATOR CO.—AFFILIATE OF REYNOLDS METALS CO.

SEE OUR CATALOG IN SWEET'S



See your wholesaler or Mail Coupon Today:

Richmond Radiator Company AA-12
19 East 47th Street, New York 17, N. Y.

Please send me additional information and literature on the new Richmond Boilers. No obligation, of course.

NAME .....
COMPANY .....
ADDRESS .....

Signal of Security

Though tiny in terms of illuminating power, the glimmer of a Christmas Candle is in many ways the most piercing light in the world. For to those who would alter the meaning of American freedom, this glowing flame stands as a symbol of renewed faith in our Creator and in our inalienable rights to life, liberty and the pursuit of happiness.

Again this year it is our sincerest wish that the warming glow of the Christmas Spirit will burn brightly for you and yours. And we join with you in joy and thankfulness for our many blessings in this great land of ours.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. STEEL-SERVICE PLANTS AT: NEW YORK • BOSTON • DETROIT

PHILADELPHIA • CINCINNATI • CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

AMERICAN ARTISAN

New Heating Theory Gains Acceptance

As the trend toward basementless houses continues, a simultaneous trend toward the principle of perimeter warm air heating has been developing. The perimeter system, which is based on the simple premise of replacing heat at the point where it is lost, provides for release of warm air at the base of windows to counteract the downdraft found at that point.

The fundamentals involved are so simple that an interested bystander might be moved to inquire why this method of heating has not been used before. This brings up the question as to whether the method is really new.

A brief review of the history of warm air heating discloses a number of instances where design innovations of many years ago have now become the forerunners of today's perimeter system. In 1936 (American Artisan, January 1936), a heating system installed in California was discussed. It was developed for basementless houses and consisted of a downdraft furnace, round supply ducts installed in trenches beneath the floor, and floor registers discharging upward located beneath the large window areas.

In 1937 (American Artisan, January 1937), a published statement on human comfort by the late Everett S. Bock, Fort Wayne, Indiana, seems to encompass the objectives of perimeter heating:

"We see, then, that to make the human body comfortable we should supply air movement, not too fast or too slow, but just sufficient to keep the immediate blanket of air surrounding the body in movement. We cannot have cold walls or cold objects for such cold surfaces increase radiation loss and we can be cold even though the immediate body air is 75 F. We must supply air which is not too dry (for this increases evaporation and so chills the skin) nor too humid, for this completely prevents all evaporation.

"The logical solution of this problem is presented as an American type of panel heating. Not a panel type of heating in which ceilings and walls are kept warm by means of buried coils or wires, but a warm air system of panel heating in which the floors are kept at a temperature above 95 F and radiation to cold walls is offset by placing a sheet of warm air between the body and the cold wall of glass."

This was an early recognition of benefits which result from placing a heat source at the point of greatest heat loss.

The principle of heating a residence by supplying heat at the outside walls where heat is lost is actually a complete reversal of accepted practice in the immediate past.

When only gravity warm air heating was available the location of registers was governed largely by the limitations of the furnace. It was necessary to find the optimum location for the furnace and then restrict the supply pipes to as short a distance as possible.

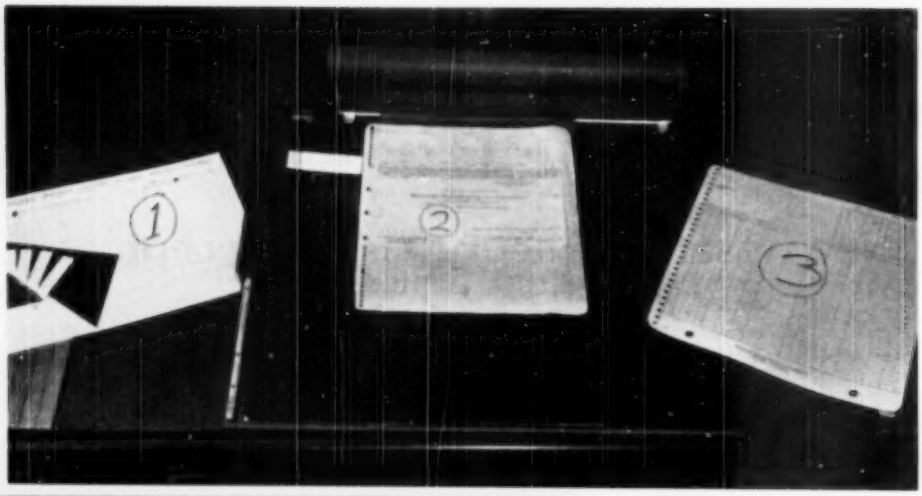
With the development of forced circulation of warm air this restriction was no longer required. Yet old customs are hard to shake off. If conducting heat to the source of heat loss approaches optimum comfort, then the advantages of the forced air furnace have for many years been only partially utilized.

Techniques for insulating the concrete slab to hold edge loss to a minimum have been developed and it is now possible to install warm air registers in outside walls without alienating the builder. The obstacles in the path of perimeter heating have been cleared away. It is up to the industry to measure its contribution to comfort and decide.

Recent surveys of heating preference and heating installations indicate an increasing interest in perimeter heating. Extensive research into the reasons for this preference are not required to understand it.

A very simple test can be made, with no expensive instruments, which will show why people are buying perimeter heating systems.

Blow some cigarette smoke directly at a window. Since the smoke drops rapidly toward the floor, it is evident that there is a downdraft of cold air moving down across that window at a rapid speed. Reversing this downdraft has become a new and accepted concept of warm air heating. That feature alone makes a great contribution to *Indoor Comfort*.



Basic elements of payroll and job cost system developed to meet contractor's special problems. 1) Weekly time sheet in duplicate. The duplicate is perforated into 10 strips which are separated and filed by job; 2) The central operation sheet in which the paycheck, individual earnings record and week's payroll summary are posted simultaneously in a single writing; 3) The job cost sheet which replaces the company's accounts receivable ledger. On it are posted all labor charges, billings, and payments for the job.

The author (left) explains details of operation of new system to member of the payroll department

Simplified Bookkeeping System Solves Problems For Detroit Contractor

B. ANDERSON*

ANY contractor in the heating and sheet metal field who has developed payroll bookkeeping headaches as a result of complex payroll and job cost problems, handled by one bookkeeper or a necessarily small bookkeeping staff, can profit from our experience in modernizing our payroll and job cost system.

Although we have also given close attention to the newest developments in our business and two years ago modernized our business by buying, remodeling and redecorating our own building in a new convenient location, we found that the most important part of our business, profitwise — our bookkeeping system — seemed to

*Secretary-Treasurer, Wesco Waterproofing Co., Detroit, Mich.

be in the Model T stage. Repeatedly we found that it led to inaccuracies, was responsible for excessive accounting costs and was time-consuming.

Job-Diversity

With 75 employees usually at work on some 25 different jobs at a time (and sometimes as high as 50) we had it brought home to us repeatedly that despite our modernization program, which was bringing us increased business and profit opportunities, we were handicapped in the part of the business responsible for controlling profit dollars and showing us exactly where we stood at the end of the week, month or year.

As is common in our business, one specialized workman would often travel around a dozen jobs in the course of a couple of days, working an hour or two on each job. Other jobs would have rather sizeable gangs employed on them for several days at a time.

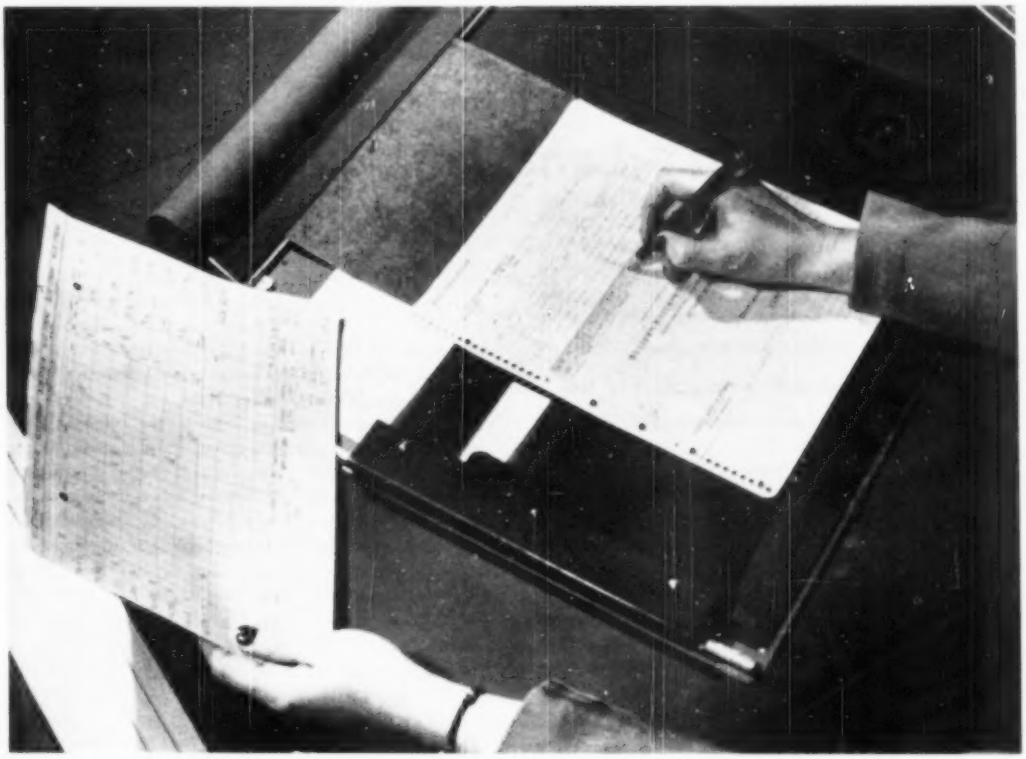
The problem of rounding up all the time figures, labor costs, material costs, and handling our payroll and billing with efficiency and accuracy was a constant and knotty one.

The Old Way

Briefly, here's the way our old system worked: Daily time sheets from the foremen on each job were accumulated during the week and prior to payroll day were

Final step in the payroll process before signing and issuing checks is protecting the check amounts on a check writer.

The actual posting operation with this set of forms. In a single writing, payroll data is posted on the paycheck stub (top), individual earnings record (center sheet), and payroll summary (bottom sheet).



posted on a single big sheet, nearly three feet wide, which combined payroll summary and job cost distribution.

This meant that if one man had worked on ten different jobs in the course of the week, the bookkeeper had to carry entries all the way across this unwieldy sheet, greatly increasing chances for errors.

After the big sheet had been brought into balance, which often was no simple matter, we made out a regular bank payroll check, two stubs, then posted the individual earnings record on a different sheet. Finally we picked up the job costs from the big sheet and posted them to a separate job cost sheet which was maintained for labor and materials. This made six separate postings of the same figures, which meant the chances for errors were multiplied, besides being time-consuming and expensive to operate over the year.

Convinced there must be an easier way, a method by which we could modernize our bookkeeping as we had modernized other phases of our business, we called in an accounting payroll expert of the Todd Company of Rochester, N.Y. He made a thorough study of our existing system, quickly detected the flaws in it and added some valuable information from his knowledge of a new type of voucher check which had just been developed by his company.

After considerable study, plus many hours of work with us in blue-printing our exact needs at no cost and without obligation to us, we developed a procedure which we estimate saves us at least $1,000 a year in actual provable bookkeeping economies, to say nothing of the gain made through increased accuracy, a hidden savings which means bigger profits for us.

The New Way

Here's the way our modernized accounting system works — and it's simplicity itself:

1. A newly designed weekly time sheet was developed, to be made out in duplicate. From this simple, easy-to-handle sheet, all necessary payroll information can be picked up accurately at a glance for the next step.
2. In a single writing on a posting board known as the Form-Master, we post the payroll summary, individual earnings record and payroll check. . . . payroll completed!
3. The original of the weekly time sheet is separated from the duplicate and filed in a post binder.
4. The duplicate of the time sheet is perforated into 10 strips, each strip for a different job. These are torn apart, sorted down and filed by job. When the job is completed, these strips provide a complete and accurate record of all labor costs — total hours and gross earnings. An adding machine tape is run to give the posting for the job. The job cost sheet gives the rest of the information needed to bill the job and it also is designed to replace our accounts receivable ledger as it records all billings and payments.

Our payroll and cost bookkeeping work has actually been cut in half.

Accounting – Language Of Business

BETTY LEE GOUGH

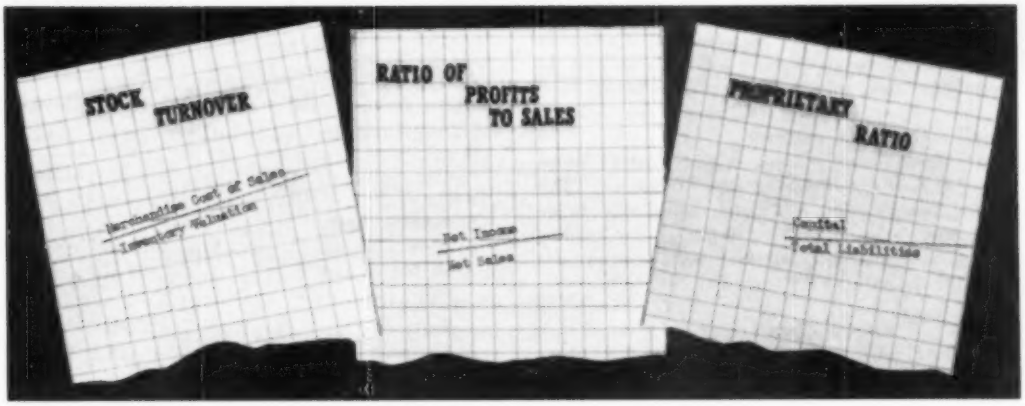
Methods, not forms, are the most important phase of accounting according to the expert quoted in this article.

HOW can a petty cash account be guarded against petty losses? Why have such an account anyway? What is the simplest way of valuing inventory stock? What controls are needed over the *Indoor Comfort* dealer's accounts receivable?

Recently, William V. George, research associate at the University of Mississippi's Bureau of Business Research, took a long look at these and other vital accounting questions which touch directly upon the management of every heating and sheet metal business. His answers were passed on early in 1950 to Mississippi *Indoor Comfort* dealers, and other businessmen by the University's Bureau of Business Research. These solutions to accounting problems apply as well in Minnesota, Maine or Montana as they do in Mississippi.

Mr. George states that "accounting is the language of business." It is the medium through which operating results are made known. His advice on simple, but highly accurate, accounting, which is complete enough to do three things that should be accomplished ("record business transactions, safeguard assets, control operations") is concerned with methods rather than forms. Many different form systems have been developed. But forms alone do not constitute good accounting. They are merely tools to accomplish particular accounting objectives. William George's advice is concerned with the choice of objectives and methods rather than with the tools of accounting.

"Normally," he notes, "large businesses make use of



Shown above are some signposts that are valuable to business management. If the ratios expressed are in conformity with goals set by the operator of the business, then the enterprise is in a healthy condition.

a chart of accounts. This is merely a classified listing of the accounts found in its ledgers. Large firms have need for widely diversified accounts with subsidiary ledgers of voluminous nature. This breakdown of accounts is not necessary in smaller businesses such as the average *Indoor Comfort* dealer's operation, although the most important accounts are found in all sizes of firms. All organizations have assets and liabilities. In small businesses the necessary accounts may be few, but all important nonetheless."

Controlling Cash

Control of cash is probably the most important single problem for any contractor other than those who operate their businesses singlehandedly. Any firm employing office help must control its cash. It is not a matter of distrusting employees. By and large, most persons are honest, or desire to be. Loose control of cash, however, creates temptation which may eventually influence an honest employee to change his habits.

Check Bank Statement

Each month, when the bank statement is received, the bank balance should be reconciled with the cash balance as shown by the ledger. The principles of reconciling a bank account are generally well understood. It is important, however, to effect the reconciliation in a systematic and orderly manner. Adjustments are necessary to bring the ledger balance into agreement with the cash balance as shown by the bank statement. The illustrated bank reconciliation takes into account items which have not been recorded by the bank. These include deposits not yet credited on the bank statement, outstanding checks, bank service charges, returned customer's checks, and other items.

Bank reconciliation should take place as soon as possible after receipt of the bank statement. This operation affords a check on the accuracy of both parties, either of whom may make errors.

Expenditures for business expenses and purchases obviously must be controlled, and only legitimate claims should be paid. One sound approach to adequate control is the use of a petty cash fund. Small expenditures are paid from the fund while large items are paid by check.

Petty Cash Fund

The amount in a petty cash fund necessarily depends upon the volume of payments being made from it. Some dealers need a $10 fund while others may require $50. The procedure ordinarily followed is to establish a fund with the total amount placed in the petty-cashier's hands, who has the responsibility of paying small bills. Expenses under a specified amount should be paid from the fund, and with each outlay of cash a receipt should be obtained. At all times, total cash plus receipted vouchers in the petty cash fund should equal the original amount of the fund. When the fund gets low, the receipted vouchers are collected and totaled. Replenishment in the amount of the receipted vouchers is then made to the fund from general cash. This latter operation results in debits to expense accounts on the basis of the receipts, and a credit to cash.

Use of a petty cash fund eliminates writing checks for small expenditures — saving time, stationery expense and bank charges if these charges are based upon the number of checks written.

Pre-numbered checks should be used so that all checks can be accounted for when they are returned by the bank. After cancellation by the bank, all checks should be booked in numerical order and filed away. Many types of voucher checks are in existence. One example

is a perforated form, half of which is the check blank, and the other half (likewise pre-numbered) is a voucher form which contains space for a full explanation of the expenditure—date, amount, payee, address, invoice number, etc. These voucher forms present the basis for charges to the various accounts.

"A further control of cash can be obtained by requiring counter-signed checks," says Mr. George. "This requires both partners, or a person in authority, to approve through his signature payment of the liability. The requirement affords additional control over possible fraudulent disbursements."

Check Credit Picture

Indoor Comfort dealers who extend credit to their customers should maintain careful control over accounts receivable. Current accounts are much easier to collect than past due accounts. If credit terms are net thirty days, accounts may become doubtful of full collection when they become ninety days past due. The average dealer can usefully spend a good portion of his time watching accounts receivable and pressing for collection of past-due accounts.

When accounts are carried past the due date, working capital is then invested in doubtful receivables.

Most owners and managers realize what is at stake when credit is granted. In small communities, the dealer knows his customers, their financial status, and their credit standing. In such cases losses are probably not great. Where any doubt exists, it would be well to investigate applications for credit through the local credit bureau. Local credit bureaus offer many services, and through correspondent bureaus in other cities and states accurate information may be obtained on new residents in the community.

Inventory Important

Another important item in any business is inventory control. The inventory must be protected from theft, damage, and loss by fire, flood, and earthquakes. Protection against acts of Providence can best be provided through insurance.

Both the opening and closing inventory valuation figures directly affect the statement of profit and loss and the balance sheet. Some methods of valuing inventories for statement purposes are: 1) first-in first-out (FIFO); 2) last-in first-out (LIFO); 3) lower of cost or market; and 4) base stock. These four methods, and variations, form the nucleus of inventory valuation principles. Large firms have various reasons for using specific methods. To employ some methods, however, comprehensive records are needed which would not be feasible for *Indoor Comfort* dealers.

One accepted accounting principle available to small business for inventory valuation is use of "lower of cost or market."

For inventory valuation purposes, each item is valued at the lower of the two values. Item 1 would be valued at $12.00, its cost. Item 2 would be carried at $22.25, its current cost; and item 3 would be valued at $15.50, there being no change in original and current cost.

This principle is favored by accountants because of its conservative nature. Valuation in excess of present cost is unrealistic. From a conservative standpoint, accounting should anticipate losses but not profits. This method of inventory valuation is also acceptable for Federal income tax purposes. It is comparatively simple, requiring only a knowledge of current, as compared with original, cost prices.

When the actual count begins, one person should call out each item and the quantity. These figures will be recorded by a second person who will repeat the figures back to the counter, after recording. Each group should be labeled or checked off as having been recorded so that they will not be recorded again. Inventory tags best accomplish this. After recording has taken place, a supervisor will determine that all items have been counted.

Recording Values

After all merchandise has been counted, summary sheets are prepared by transferring results from the original sheets to the summaries. The next step is to insert each item's value as determined by lower of cost or market. Before cost extensions are made, all figures should be scrutinized to see that no errors or transpositions took place when transferring data from the original to the summary sheets.

Extension of individual items are then made and the resulting columns are totaled. All summary sheet totals, taken together, produce the total inventory valuation. Incorrect valuation at the end of an accounting period not only distorts the current year's operating results, but also affects the profit or loss figure for the following period.

(Please turn to page 120)

BANK RECONCILIATION

Balance per ledger		$2190.57
Balance per bank statement		$2494.27
Add deposit not credited by bank		60.50
		$2554.77
Deduct:		
Outstanding checks		
#14	$200	
#15	100	
Bank charges for:		
Exchange	.10	
Collection	.25	
N.S.F. check		
John Doe	$ 63.85	364.20
		$2190.57

Damages For Contract Delays

ALBERT W. GRAY

Jackson Heights, Long Island

Delays in the completion of installation contracts can be disastrous financially to the heating and sheet metal contractor. At a time when material shortages can cause these delays it is well to know the legal aspects of damage suits that may arise.

DELAYS that are merely incidental, occasioning no interference in the ultimate performance of a contract, are no ground for damages. A real delay, one that deprives the other party to the contract of what he paid to receive leaves the party injured two alternatives. He may refuse to accept the job since delayed performance of an essential character is not faithful performance. On that ground he can withhold payment of the contract price, paying only the reasonable value of the work or material received. He may accept the delayed work when completed and collect whatever damages suffered by reason of the failure to perform in the agreed time.

The mere acceptance of the finished performance is not a waiver of the damages arising from the delay. The right to damages of this character survives the acceptance of the completed work. It often happens, however, that in the negotiations relating to such acceptance the party who has suffered from the delay unconsciously bargains away the rights he has for such recovery.

Restaurant Installation

A contractor undertook the installation of a heating and ventilating system in a restaurant at Lynn, Massachusetts. The furnishing of this and other equipment under the contract represented $26,000 of which $16,000 was payable during the progress of the work and the remaining $10,000 in eighteen monthly installments secured by notes and a conditional sale contract. The work was commenced in April and completed the middle of the following July.

During this period the contractor was hampered by delays in the delivery of material he had agreed to supply under the stipulations of his contract, with consequent delays in installation. When the difficulty arose he explained the situation to the owner who assured the contractor he was willing to agree with the suggestion of using temporary material until the equipment agreed upon was available.

Contract Breach Charged

Suit was ultimately brought by the contractor for the recovery of the unpaid balance of the contract price. The restaurant owner made the defense that the contractor had failed to perform his contract in "good and workmanlike manner," and as a consequence was not entitled to recover the balance.

This restaurant owner, asserted the court, was in no position to contend that the delay in this instance precluded the recovery of the amount agreed upon in the contract. Not only had the restaurant owner been acquainted by the contractor with the difficulties in securing deliveries but he had assented to the use of temporary material.

"Here was a substituted performance agreed upon by the parties and not a mere waiver of non-performance. What was done was the agreed equivalent of what was originally promised," and recovery was awarded the contractor.

Another incident of this character occurred in New York in which a contract was made for the installation of two electric elevators, one to be in operation by February 2nd and the other as quickly as possible after that date. The necessity of one elevator operating by that date was stressed by the owner as no rent was payable under a lease he had made of the building until elevator service was available.

The first elevator was not installed and in operation until March 2nd. As a consequence the owner was deprived of the February rent of $1,750. The owner however did not terminate the elevator installation contract on that date but permitted the contractor to continue until the work was completed.

Here the failure of the owner to end the contract when the equipment was not installed on the date agreed upon, asserted the court, was a waiver of his right to repudiate the contract and when suit was brought by the contractor he was entitled to recover from the owner the full amount stipulated in his contract.

Nevertheless, permitting the contractor to complete this contract did not deprive the owner of his right to recover the damages he had incurred through this delay and to offset those damages against whatever balance was due under the terms of the agreement.

"The mere forbearance to insist upon a forfeiture," said the court, "did not constitute a waiver." While the contractor was entitled to the unpaid balance of the contract price the owner was entitled, on the other hand, to whatever damages he had suffered by virtue of the unexcused delay in performance.

Two Standards

This phase of our law that substantially permits an owner both to eat his cake and have it too, sets up two standards by which delays arising in the installation of ventilating or heating equipment may be measured for the losses endured by the other party to the contract. 1) a repudiation of the contract and refusal to accept the completed work or 2) acceptance of performance with the assertion of the claim for whatever damages may have been incurred.

While the substance of a controversy of this character in California involved a gasoline launch and not ventilating equipment the rule of law is the same and the incident clearly outlines the rights of the purchaser under this contract for delivery by June 1st, when delivery was delayed until August 8th.

Holding that the purchaser, in spite of urging delivery after the stipulated date, and accepting performance after two months delay, was entitled to offset whatever damages had been incurred by this breach of contract, the California court stated the law to be, "The party not in default is often constrained by his necessities to take what he can get under his contract when he can get it. Such conduct does not and should not operate as a waiver of the right of action for damages."

This right to the recovery of damages from the contractor even after the contract had been performed and its benefits accepted, may however be lost by the conduct of the other party to the agreement.

In such an instance in Virginia the agreed date for delivery was September 22nd, when it was essential that the buyer have the material for which he had contracted. Delivery was delayed until November 1st, five to six weeks after the stipulated date for performance.

When delivery was finally made the buyer gave his note for the balance due under his contract; then when he was sued on this note and not until then did he attempt to offset the damages he had incurred from the delay.

The giving of this note, said the court, was a new contract. By giving the note and so making a new contract the buyer lost his right to insist upon his damages. The buyer, after the breach of the agreement, by offering this note, substituted a new contract and by his promise represented by the note waived the protection he had under the law and forfeited his right to damages.

Payment Means Acceptance

An Iowa court said of this payment of money due under a contract or of the giving of a note for such amount, when a delay in performance had occurred, that one who questions or denies the justice of a demand upon him for the payment of money has his choice, either to make a voluntary payment and so avoid trouble and annoyance or, on the other hand, resist and take the judgment of the court upon the controversy. If he adopts the former course he is bound by it and cannot thereafter have recourse to the latter.

Should a delay occur in the delivery or installation of equipment, before the temper and attitudes of the parties to the agreement become acute from friction, the original contract may often be changed or modified to conform to the circumstances which neither party to the contract had anticipated. When a lawsuit has been instituted or even threatened such an opportunity for adjustment has generally vanished along with any of the one time feelings of good will and cooperation. By modifications of the original agreement in relation to delivery to conform to circumstances that have subsequently arisen, the original agreement can be made to absolve the sins of delay.

Contract Changed

A dwelling was destroyed by fire in Massachusetts not long ago and an agreement made for repairs. Oral modifications were made from time to time beginning with the day the agreement was signed until the original cost had been cut by a third and delays that had arisen during performance adjusted. Sustaining the contractor's right to recover in spite of delays on the ground that deliveries conformed to the original agreement, though varied and modified by subsequent changes, the court held that the original contract had been modified by new delivery dates supplanting the old and that the subsequent changes became an agreed equivalent for the original agreement thus erasing any liability that otherwise would rest on the contractor for delay in performance.

References

Morris Gordon & Son v. Totoni, 85 N. E. 24 319
Crocker Wheeler Co. v. Varick, 43 Misc. (N. Y.) 645
Stephens v. Wey Zuckerman & Co., 163 Pac. (Calif.) 975
Reid V. Field, 1 S.E. (Va.) 395
Medart v. Dubuque, 96 N.W. (Iowa) 770

Social Security Extension Brings Self-Employed Contractors Under Provisions Of The Act

Recent changes in the Social Security Act are of considerable importance to all heating and sheet metal contractors. They are now brought under the coverage of the act, as of January 1, 1951. Calculating the amount of tax due and the method of paying it is discussed.

EVER since 1937, *Indoor Comfort* dealers have been deducting social security payments from their employees' salaries and matching the amount deducted. Now, some sweeping changes have been made in the law. They will affect every heating and sheet metal contractor in the country. Most important change is the provision which brings the owners of unincorporated businesses under the act.

Questions and Answers

Here are some pertinent questions now being asked about this new provision, and authoritative answers:

Q. Is every self-employed man eligible for this new social security payment?

A. With only a very few exceptions. Professional people are not covered. They cannot qualify for social security even if they desire to. Specifically, the law exempts the following: doctors, dentists, lawyers, self-employed farmers or the owners of farms, optometrists, osteopaths, chiropractors, naturopaths (doctors who don't use drugs), Christian Science practitioners, full-time public accountants with exclusive practices, engineers practicing as consultants and professionals, architects and funeral directors.

Also exempted are the self-employed who earn less than $400 a year.

Q. I have all the insurance I need. Must I contribute to social security even if I do not wish to do so?

A. The government is much given to terms like "eligible" and "extending the benefits to 10 million more people" when discussing the new social security schedule. But this is a little deceptive. You will have these benefits extended to you whether you wish to benefit or not.

Q. When do I pay my social security tax?

A. At the end of the year, when you make your final and amended income tax return. This simplifies paper work for the contractor, giving him one instead of several forms to fill out. It also helps the government to obtain the money because you can't lie about your earnings for the year without falsifying your income tax.

Q. Where do I pay it?

A. To the local Collector of Internal Revenue, just as you have paid your employees' income tax witholdings and social security taxes in the past.

Q. At what date does all of this begin?

A. Social security payments for the self-employed will be required for the calendar year 1951. Payment will be due annually. Thus the first social security payments must be turned in no later than March 15, 1952, the deadline for payment of 1951 income taxes.

Q. Will the government furnish special forms?

A. There will be no separate forms. Instead, a special space will be provided on the income tax return form. This will be inserted in the forms for use on 1951 income.

How Much?

Q. How much do I have to pay?

A. The amount at the beginning is $2\frac{1}{4}$ per cent. This figure will be increased in 1955, 1960, 1965, and 1970.

Here is the future schedule of social security payments for everyone:

	Employer	Employee*
1950-'53	$2\frac{1}{4}$%	$1\frac{1}{2}$%
1954-'59	3	2
1960-'64	$3\frac{1}{2}$	$2\frac{1}{2}$
1965-'69	$4\frac{1}{2}$	3
1970 and after	4-7%	$3\frac{1}{4}$

* Employee deduction is matched by employer.

While this schedule has been set up by the recent legislation there is no certainty that it will be followed out to its terminus.

Q. Do these percentages apply on all income?

A. No. Only on the first $3,600 of net profit. Above that there is no further tax.

Q. A $3,600 limit was mentioned. Our employees' salaries have been exempt above $3,000. Isn't this a discrepancy?

A. The law provides that the $3,000 ceiling on employees' salaries will be raised to $3,600 as of Jan. 1, 1951.

Q. Will this $3,600 figure be changed as the percentage of taxation rises over the years until 1970?

A. That amount is to stay constant.

Q. Will my salary from the company be considered in the state payroll tax that goes to make up the social security unemployment compensation fund?

A. No. You won't get unemployment insurance. But you will be entitled to the same old age and survivors benefits that your employees (and their survivors) are presently entitled to receive.

Q. Some of the people who work for me are really independent contractors. Does this new law mean that I must begin to withhold and match social security payments for them?

A. The line that divides an employee, in the tax sense, from an independent, outside contractor is a very narrow one. You may be unintentionally violating the law right now in considering these men as independent contractors. It would be well to check with the local Collector of Internal Revenue to determine whether these men are rightfully classed as independent contractors. If they are, you are not obligated to withhold social security payments. The men will have to pay the tax themselves.

Q. My company is a partnership. Until this new law came into effect, we paid no social security because we were owners. Now do we withhold tax from the salaries we draw or pay individually at the end of the year?

A. The income tax definition of a partner is applied for social security purposes. As part owner, the partner will pay $2\frac{1}{4}$ per cent tax on $3,600 at the end of the year, along with the income tax.

Q. How does the law apply to irregularly employed workers, like porters or handymen?

A. There are two qualifications that are set up for coverage of irregularly employed personnel:

1. They must work for you, either part or full time, on 24 days out of the calendar quarter.
2. During that three months, they must have received at least $50 in pay for services.

If these conditions are met, then you must deduct the required amount for social security and match it with your own contribution.

Change in Computing

Q. What does the new law do to change methods of computing employees' benefits?

A. Under the old law, the first step was to figure out the total wage subject to tax. This amount was then divided by the total number of months in the period beginning with 1937 up to the date of retirement. The result was the average monthly wage.

The benefit was calculated by taking 40 per cent of the first $50 of the average monthly wage, plus 10 per cent of the next $200 of average monthly wage. To this was added 1 per cent of the sum of these, multiplied by the number of years' coverage.

The new law gives those workers who will work at least $1\frac{1}{2}$ years after 1950 the option of taking Jan. 1, 1951 as a starting date for figuring the average monthly wage, if this will result in a higher benefit. The same method of arriving at average monthly wage is used whether 1937 or 1951 is the starting date.

The new law specifies the following procedure. Take 50 per cent of the first $100 of average monthly wage and add 15 per cent of the next $200 of average wage. The result is the primary benefit.

Sample Calculation

Q. Can you give an example?

A. Suppose a worker has an average monthly wage of $250 when he retires. Taking 50 per cent of the first $100 would give $50; 15 per cent of the remaining $150 would amount to $22.50. The workers benefit would thus be $72.50. Maximum individual benefit is $80.

Q. How does the self-employed man figure his benefits?

A. The self-employed man calculates his benefits in exactly the same way as the man who works for him.

Q. What about family benefits?

A. The pensioners wife is entitled to 50 per cent of the benefit her husband gets, if she is over 65. If he dies, his widow is entitled to 75 per cent of the benefit, each dependent child or parent, 50 per cent.

Q. What are the limits to payments to a worker and his family?

A. Maximum benefit is $150.

Q. Has the retirement age been changed?

A. There has been no change. It is still 65.

Q. Can a retired worker have any other income?

A. Under the old law he could earn up to $14.99 a month. Now he will be able to earn up to $50 a month without any restriction of benefit payments. After age 75, earnings can be unlimited.

Q. When will the provisions of the new law take effect?

A. Newly covered workers will begin paying taxes on Jan. 1, 1951, on a wage base of $3,600.

Increased benefits to workers already retired were paid beginning in Sept. 1950.

Depreciation – Important Profit Factor

ARTHUR ROBERTS
Pompton Lakes, N.J.

Unless properly handled depreciation can cause difficulty for any business. Any enterprise which uses machinery should make provisions for the eventual replacement of that equipment.

DEPRECIATION is an important factor in business management. Unless handled properly:

1. Net worth will be inflated.
2. Overhead will be computed incorrectly.
3. Prices will be figured too low for adequate profit.
4. Income tax payments will be too high.
5. The books will show an inflated value for fixed assets.
6. Experience records, an aid to effective cost control, will be erroneous yardsticks.

What is Depreciation?

So much has been said and written about depreciation that it is no wonder that many contractors are confused about this internal expense. We will discuss fundamentals so the reader will have the basic factors clear in mind and thus have sufficient knowledge on this subject to handle it wisely in the future. Briefly, depreciation may be divided into three main classifications: 1) Its purpose; 2) Its computation; 3) Its handling from an accounting standpoint. We will explore these three classifications in the order named.

The purpose of depreciation is two-fold: a) To include the depreciation charge in overhead expense so the cost of a depreciable asset, pro-rated over its life, may be recovered from customers in the selling prices charged to them; and b) To record gradual decreases in asset values so that net worth does not become inflated.

By omitting depreciation expense from his overhead or by figuring it too low, the dealer short-changes himself. He doesn't add enough burden to the cost of jobs sold, thus decreasing the net profit anticipated, an experience common to more than 50 per cent in this field, if our field studies are any criterion.

If a dealer's sales are $100,000 and his overhead expense without depreciation totals $30,000, the overhead-to-sales ratio for computing selling prices is 30 per cent. If his overhead expense *plus* depreciation totals $33,000, his overhead-to-sales ratio is 33 per cent, hence, in figuring the mark-up or margin on merchandise to be sold, he will not be getting enough for his equipment sales if he omits depreciation when establishing selling prices. In this hypothetical case, he will cut his net profit 3 per cent, which, in a field where profits are limited, may put a business in the red. To get profitable selling prices, the dealer must include an accurate overhead percentage to sales. If this percentage is reduced by the omission of depreciation expense, his selling prices will be reduced accordingly.

Rates Vary

Fixed assets, such as business property, furniture and fixtures, office and shop equipment, handling equipment, trucks, etc., depreciate at varying rates. This should be estimated carefully and the expense included in overhead so that it is taken into consideration when the mark-up or margin is fixed on re-sale equipment. The accounts receivable depreciate in value also, and this loss should be taken care of by an allowance for bad debts. Equipment carried in stock may also depreciate through damage, obsolescence, etc., but this loss is accounted for in the ending inventory figure, if the count is taken at realistic values.

Whether a depreciable asset is bought for cash or on a time basis has nothing to do with the depreciation charge. Neither is the charge limited to the year of purchase. If assets are listed at cost prices, net worth will be inflated. Thus many dealers have assets recorded at what they cost originally when they are worth much less or little more than salvage value. The difference should have been written off annually from the time of purchase. Financial statements of these dealers show a bloated net worth.

Only a Estimate

Computation of depreciation is always an estimate; there is no way to figure it to the penny. We have never known a case where depreciation charges at the termination of the equipment life have equalled the original cost. Because this expense is not determined with the accuracy of payroll accounting, the dealer should give thought to the annual charge-off, far more thought than

be customarily gives it. First, take the cost of the asset, which is known. Its profitable life is the unknown factor. Estimate this life-span by checking against experience figures with the same or similar assets. Lacking such experience records, seek advice from equipment manufacturers, accountants, those using similar equipment or qualified appraisers. With the life-span set, divide the years into the cost to arrive at the annual depreciation charge. Pro-rate it monthly and include in overhead expense.

Depreciation varies with the asset. Certain assets have a longer span of usefulness than others. This must be considered when setting the rate. A building depreciates less rapidly than machinery, a truck more rapidly than office furniture, etc. The care given equipment is another factor. Unless equipment is kept in good condition, it will depreciate more rapidly than estimated.

Separate Account

Handling of depreciation on the books involves opening an account for this expense, charging profits with the annual installment, or 1/12 of this sum monthly, which is preferable. The offsetting credit goes to a reserve for depreciation. Compute this expense upon each machine or group of similar machines separately, but all entries may be made on the same ledger page for convenience. The same thing applies to the offsetting reserves. They may be placed on one page in the ledger headed. Reserves for depreciation.

Never increase the original cost of a depreciable asset. Even if market value increases, that does not warrant the taking of appreciation. When assets are written off completely, depreciation ceases. Obviously, profits in subsequent years tend to increase without this load. We frequently come across dealers who have written their depreciable assets off the books and are reluctant to invest in more modern replacements because they do not want to reduce their profits in subsequent years with depreciation charges on the new equipment. This is a short-sighted business policy. Old or obsolete equipment, whether a truck, squaring shear, brake, or store front, indirectly increases the overhead ratio to sales because they do not produce a maximum sales volume. Modern replacements keep volume high, and the overhead ratio to sales low, even when the depreciation charge-off is included in the burden.

"How shall I figure a fair rate?", is a question often asked by dealers. There are about 10 methods of figuring depreciation rate. Many dealers have asked us to detail these methods, assuming that a method other than the one they are using might reduce this expense. This assumption is incorrect. Most industrialists, after considerable experience with all methods, have come to the conclusion that the straight-line formula gets the right answer in the long run with the least bookwork. Say that the original cost of a depreciable asset is $1,000, that the estimated life span is 10 years, that the estimated salvage value at the termination of write-downs is $50, then you have $950 to write off in 10 years, or $95 a year.

It is estimated that 90 per cent of the businesses in this country use this formula. Moreover, the Treasury seems to prefer it and fewer depreciation deductions will be challenged if you use it. Then too, the Treasury places much reliance on experience figures. If you have a backlog of such records on depreciable assets of a similar type used in prior periods and base your deductions on them, they are likely to be passed even though they are higher than average, which may happen if you use the assets more than they are customarily used. For example, Bulletin F issued by the Bureau of Internal Revenue covering depreciation rates states that four years is a reasonable average life-span for a light truck. But wear and tear depend much upon the use of equipment. One dealer may use a truck much more than another. Thus it will depreciate faster and may be ready for the scrap heap in three years. If he has experience records to prove this, he has a good chance of writing off his rolling stock in three years and getting the benefit of an increased yearly deduction for depreciation.

Effect on Tax

Income tax is an important factor. If you do not charge off enough depreciation, your profits will be higher on paper and you will pay more tax. This overpayment you cannot retrieve because it is up to you to take adequate depreciation each year. If you don't, the Treasury won't let you deduct for the shortage in a subsequent year. Then too, you can't ask your customers to pay higher prices after the sales have been made just because you costed these transactions too low, not having included depreciation expense. With taxes high, the dealer has far more financial interest in depreciation today than he had a few years ago. If you don't charge enough dollars for wear and tear, you'll pay a higher income tax than you should, besides the profit lost underpricing jobs. So, it pays to go into this matter of depreciation closely and compare the recorded value with a physical appraisal of the depreciable assets to determine whether you are getting all that's coming to you.

Thousands of dollars are lost by *Indoor Comfort* dealers and sheet metal contractors every year because they do not take enough depreciation or overlook it entirely. We know dealers, even those who watch their costs carefully otherwise, who do not include depreciation in their overhead or do not include an adequate amount. In effect, this is like giving away all or part of their trucks, fixtures, business property and working equipment. If the dealers live long enough and follow this practice, their customers will get these assets for nothing. Besides, there is the menace of price-cutting to consider. The dealer who doesn't include depreciation in his costs is likely to be an unwitting price-cutter. So, in this hectic period, with taxes and costs increasing, it pays to take every step to assure a profit. Depreciation is one major factor you can't afford to overlook.

Arnold Kruckman's

Washington Letter

Restrictive Orders Increase

THE struggle behind the curtain in National Production Authority that preceded publication of the order cutting back civilian use of aluminum 35 per cent during the first quarter of 1951, was bitter and prolonged. Every major element in the aluminum industry or affected by the curtailment of aluminum was in the free-for-all. If the NPA orders had been issued as scheduled they would have completely stopped the use of aluminum for almost everything manufactured or used by the industries served by AMERICAN ARTISAN. Purpose of the original order was to virtually stop use of aluminum for all construction and building purposes, and manufacture of the many appliances used in a home.

Only Temporary

The softened order issued does not mean that it will not happen. As may be seen later, it is almost certain that the usual consumer use of aluminum will be wholly stopped within the relatively near future. The present requirement is that 35 per cent aluminum production must be allocated to defense purposes despite the fact that the aluminum industry asserts it will be some time before the armed services will be able to absorb more than 10 per cent. The defense people come back and tell you that the use of aluminum will expand with amazing rapidity and that in addition, it is necessary to stockpile a minimum of 200 million pounds as swiftly as possible. In 5 years the stockpile will reach 1.8 billion pounds. The whole stockpile picture is a story in itself. It has to do with the recent upheaval in the Munitions Board which resulted in the deposing of one head and appointment of another.

As presently ordered, manufacturers of products for civilian use will each receive 65 per cent of the amount of aluminum they used during the first half of 1950. Most representatives of the manufacturers who appeared in Washington to make the fight told us that the order means approximately 300 of the 17,000 aluminum fabricators will go out of business in January. They told us that consumers will be deprived of a great number of items which could easily be made of aluminum scrap that has no use to the defense people. Further restrictive announcements are expected in December which will affect 70 per cent of the primary products. The outlook for production from aluminum for civilians is not optimistic.

The only rift in the cloud is the watery comfort in the announcement that in December users of aluminum will be permitted to receive 100 per cent of their average monthly consumption during the first half of this year. Also, small business units, which use less than 1000 pounds of aluminum a year, are not affected by the recent order. In theory they should be able to obtain anything they need. Bear in mind, however, that there is a gap between theory and actual procurement. Those who use aluminum for maintenance, repair and operating supplies are permitted, under the present order, to procure 100 per cent of the volume they used during the base period. Inventories at no time may exceed a 60 day supply, or a practicable minimum working inventory, whichever is less. In those rare cases when enforcement of the order would bring about undue or exceptional hardship, particularly public hardship, or would not be in the interest of national defense or in the public interest, enforcing officers are counseled to go lightly. The NPA states that the total supply of aluminum currently available in the United States exceeds a million tons per year. This entire supply has been used for non-military purposes. It is interesting to learn that the NPA expects, before the holidays, to tell us about the plans for expansion of facilities for production of primary or basic aluminum. NPA officials most directly concerned in dealing with the aluminum industry, aside from General William Henry Harrison, are Glen Ireland, assistant to the administrator, who recently came from California; H. B. McCoy, assistant administrator for industry operations, one of the very few career Commerce department officials kept by NPA; and Nigel Bell, acting director of the Light Metals Division,

Washington Letter

who takes the place of Frank Hayes, the regular Commerce Department man. Hayes remains in the Light Metals Division but takes rank as assistant to whoever is the permanent director.

New Appointee

The manner in which newcomers suddenly break upon our consciousness here is best illustrated by a recent experience concerning the appointment of George T. Underwood as Chief of the Plumbing and Heating Section in the Building Materials Division of the NPA. The word came that the industry understood Mr. Underwood had been appointed to do a job something like that which was done by Morgan Johnson during World War II. No one in NPA had heard about Mr. Underwood. The following day Mr. Underwood was found in an obscure office of the Commerce Department building, without heat or without telephone. He was to be sworn in, in order to qualify for the payroll, sometime during the next 24 hours. You see, every person who is employed by the Federal government must take the oath of office before he or she is enrolled. This applies to the lowliest charwoman as it does to the President. Both take the identical oath. Incidentally, the old Construction Division of the Department of Commerce, headed during World War I and since, by John Haynes, has been divided into two parts. One will be known as the Building Materials Division and the other as the Construction Division. The overall direction is to be under the guidance of James Follan, of New York, well known among construction people.

What has been said here about aluminum is also true of copper. By the time this is published it is expected an order will be issued which will cut the supply of copper for civilian purposes by at least 35 per cent. This will hit fabricators and users of copper products exactly the same way as the aluminum order affected the users of that metal. Those who use it for civilian products will receive their supplies on the basis of use of the metal during the first half of 1950. The stockpile also will be built up by means of the 35 per cent allocated to the defense purposes. It is anticipated similar orders will rapidly be issued restricting in the same manner the use of cobalt, nickel, zinc, tungsten, cadmium, and manganese.

In essence, this way of handling allocations foreshadows what will happen early in 1951. The program is to put into operation the Controlled Materials Plan, introduced during World War II. Under CMP, the needs of the military were earmarked in bulk and the balance was available for civilian uses. Civilian users filed their estimates with the government agency which represented their industry. And the government agency then presented the applications of its claimants to the ultimate authority which then was the War Production Board. Here the demands made by all agencies were tailored separately to meet the urgency of each case and the supply available.

Neither the NPA nor any other government agency now has sufficient authority to function like the former WPB. A new agency with overall authority, is expected to come into existence in 1951. It is possible the National Security Resources Board may be reconstituted. At least the betting is strong that W. Stuart Symington will head whatever form the more powerful agency takes.

The real impact of these drastic orders, and others that will come, may not be definitely clear until early spring. The movement behind these constricting regulations becomes more apparent when you get a sharper impression of General Marshall's four year plan for defense production. You realize the colossal momentum behind this four year plan when you learn that General Marshall is expected to come before the final short session of the 81st Congress with a budget for defense that will require an additional appropriation of $19-20 billion. This would bring the total defense budget for the fiscal year ending June 30, 1951, to a sum somewhere between $54 billion and $55 billion.

Different Budget

This is considerably different from the budget repeatedly dangled before the tax payers by President Truman in speeches in which he insisted it would not exceed $30 billion for the same period. Not only General Marshall, but Manly Fleischmann, general counsel for the NPA, recently reiterated that the defense budget for the years ahead will average $60 billion annually. Apparently this extraordinary expansion of defense needs has sprung from the threat of five million Chinese communist soldiers who dwell ominously in the area of Manchuria, and who may turn Asia into a theater for the major conflict of World War III.

Secretary Marshall's four year plan is expected very soon to cause widespread reactivation of old camps.

(Please turn to page 132)

RESIDENTIAL AIR CONDITIONING *Section*

Indoor comfort—in all seasons for homes and small business

MARKS THE SPOT

It marks the homes of Waterbury's best salesmen!

No—the Waterbury Dealer in Hometown, U.S.A. doesn't have that many salesmen on his payroll. But, nevertheless, these homeowners do contribute to every sale he makes. Month after month, in many ways, they are convincing their friends that Waterbury means real heating satisfaction. They speak, just as the Waterbury Dealer does, of the dependability, the true fuel economy, the genuine heating comfort of a Waterbury furnace. And their words are believed—*because they speak from experience.* They are the customers of other years—Waterbury users themselves. And they—as every Waterbury man can tell you—are the best salesmen a dealer could have.

Waterbury

FURNACES AND AIR CONDITIONERS

Over 43 Years of Warm Air Heating

Waterbury

the **Waterman-Waterbury Co.**

1122 JACKSON ST. N.E. • MINNEAPOLIS 13, MINN.

Layouts For Perimeter Heating

ROGERS FOLLANSBEE, President and
W. L. THOMSON, A.S.H.V.E., Chief Engineer
Mechanical Home Systems, Inc.

Delivering heat where it is needed is the logical premise on which the heating systems described were designed. Each house has presented special problems for the heating industry. These problems were solved with heating systems that are simple and economical to install, yet offer maximum comfort.

THE THEORY OF PERIMETER WARM AIR HEATING, discussed in a previous article (AMERICAN ARTISAN, November 1950), is based on the principle that comfort will prevail in any structure if the heating system will *replace heat that is lost, as fast as it is lost, at the point where it is lost.* It was proposed that this principle can be applied practically if *warm air is discharged upward from registers in the floor beneath windows.*

The authors have developed a number of systems that will fulfill these specifications by delivering heat to the perimeter of a house. Each of these systems has specialized advantages for various type and sizes of residential construction. All are simple to install and, therefore, economical. Each system has been designed to deliver air at a relatively low velocity and low temperature, thus contributing still further to uniform comfort throughout a house.

These systems are to be tested in detail in the coming 1950-51 heating season by the National Warm Air Heating and Air Conditioning Association.

The following designs of warm air perimeter systems have proved effective in providing comfort and are suggested design procedures for several types of construction in widespread acceptance:

Medium Size House with Half Basement

A trunkline and branch distribution system is recommended. The trunkline is installed at the ceiling of the basement, usually parallel with the beam. Branch ducts may be either round or square and are connected to floor registers under windows, except in bathrooms and front entrances where it is desirable to install the registers on the sidewall. If the height of the ductwork approximates that of the beam and the branch ducts are installed between joists, the system is compact and preserves the full ceiling height.

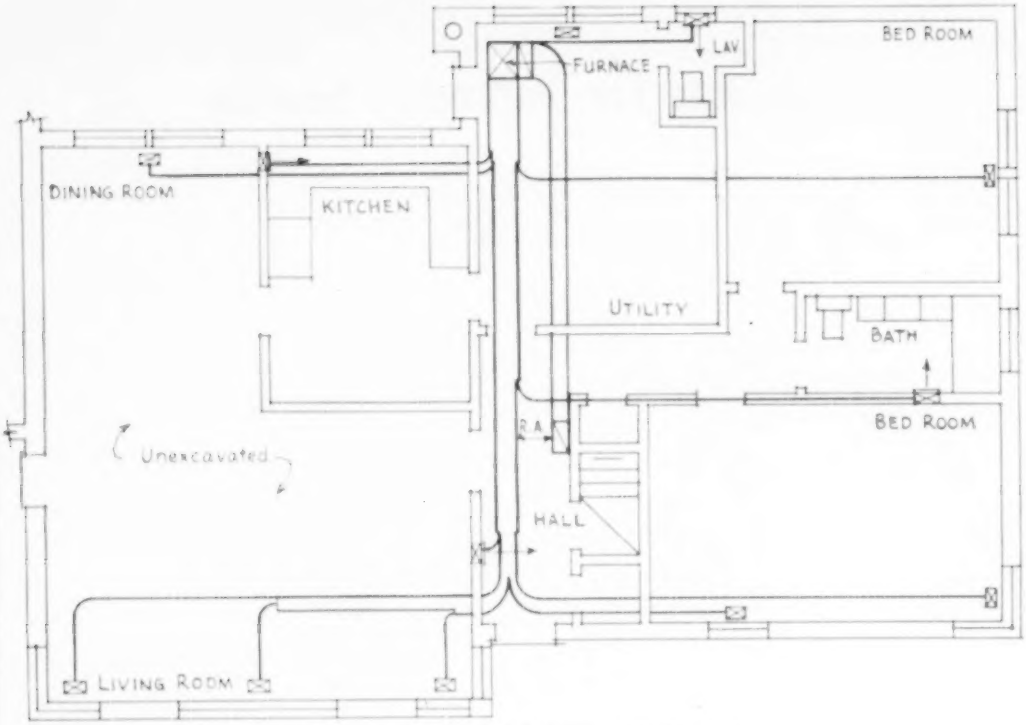
No insulation of ducts is required. Heat loss from the exposed ductwork warms the basement and if additional heat is required, outlets may be cut into the trunk.

Small House with Full Basement

An extended plenum system is recommended, a variation of the trunkline and branch system but having the same advantages. This is an especially economical system in small homes where the furnace can be centrally located. It requires a bare minimum of costly shop and site labor and needs only a little more metal than the conventional trunkline and branch system.

The furnace in this system may be placed either in the basement or on the first floor. In either case, only a small area is needed for the heating unit.

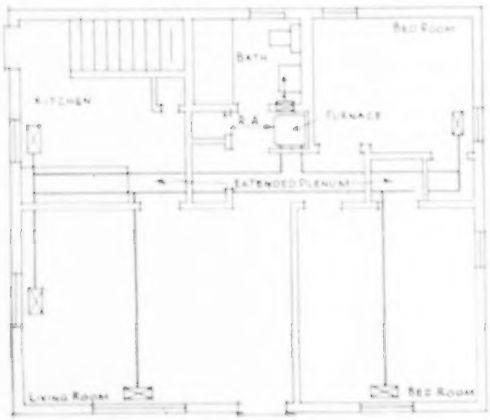
The first floor location offers many advantages when a compact downflow furnace is used. This type of unit occupies about the same area as a masonry chimney and leaves the basement entirely free for laundry, recreation, workshop, and other activities. It is an excellent solution in areas where basements occasionally become flooded. It costs no more than a basement installation.



Medium size house with half basement. Trunkline and branch distribution system. Conventional upflow furnace in the basement.

Tri-level House

Either a trunkline and branch or extended plenum distribution system is recommended. Use of a downflow furnace permits heat to be introduced into the system below the lowest living level, thus taking advantage of the natural tendency of heat to rise and permitting warm air to be delivered continuously at a low velocity. Note that ductwork is hidden in a crawl space and that risers are installed in a common partition.



Small house with full basement. Extended plenum distribution system. Downflow furnace on first floor.

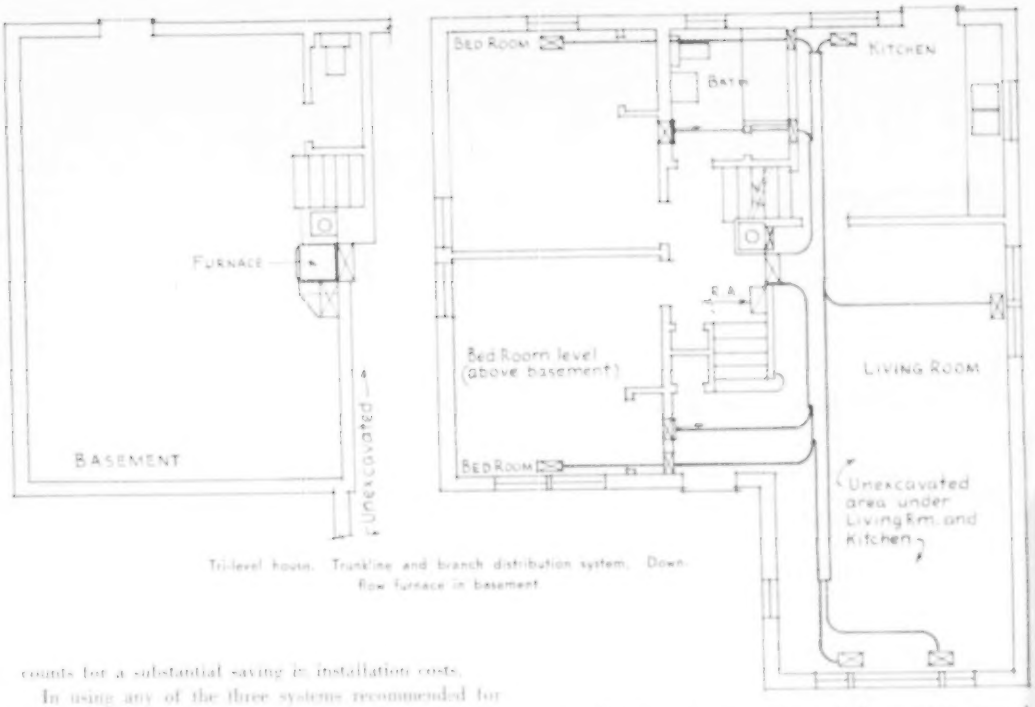
Small Basementless House with Slab Floor

A radial distribution system is recommended. Supply ducts are formed in the slab, one duct for each register. The warm air supply ducts impart a gentle warmth to the slab and floor, providing a comfortable radiant effect as the warm air flows to the registers located under windows.

Small House with Crawl Space

Either a radial, trunk and branch, or extended plenum distribution system is recommended. If radial distribution is used, individual ducts are run beneath the floor to each register from a centrally located furnace as in the concrete slab application. In either case, floors are kept warm. Heat loss from uninsulated ducts to the crawl space is utilized in warming the floor.

Radial distribution permits the use of standard size pipe which may be purchased in 10 foot and longer lengths. The pipe may be held together and made secure with drawbands or sheet metal screws. This alone ac-



Tri-level house. Trunkline and branch distribution system. Down-flow furnace in basement

counts for a substantial saving in installation costs.

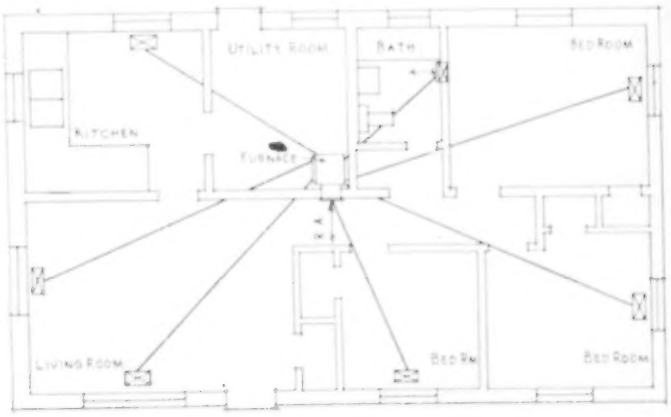
In using any of the three systems recommended for this type of house, foundation walls should be insulated and vents in the foundation wall should be closed during the heating season. In other words, the crawl space must be tight so most of the heat lost by the ducts will warm the floor.

Medium Size Basementless House With Slab Floor

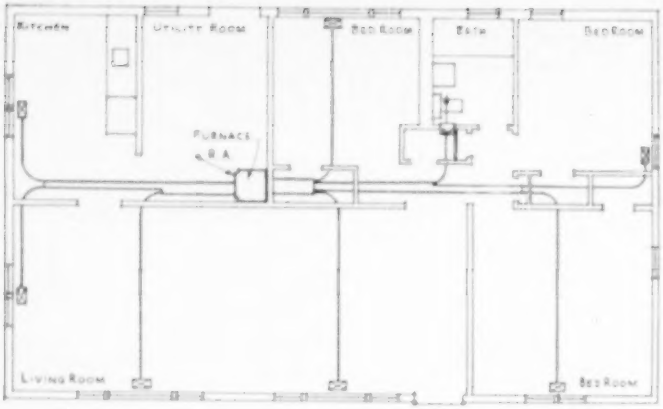
A loop perimeter system is recommended. This system is designed specifically for this type of house as radial distribution would call for too many individual feeder ducts and there would not be sufficient space for connections on the plenum. A continuous duct is placed immediately under the surface of the concrete around the entire perimeter of the building. Outlets may be taken off wherever desired. Warm air is fed into this continuous loop duct by radial feeders which are connected to a centrally located furnace.

Each System Fulfills Objectives

Whatever distribution system is selected to meet construction requirements, the thermostat setting need not be raised above 70 F. The reason for this is that with perimeter warm air the temperature difference (1 F to 3 F) between floor and ceiling is negligible. As a result, excessive heat losses through ceilings from wide tem-



Small basementless house with slab floor. Radial distribution system. DownRow furnace.

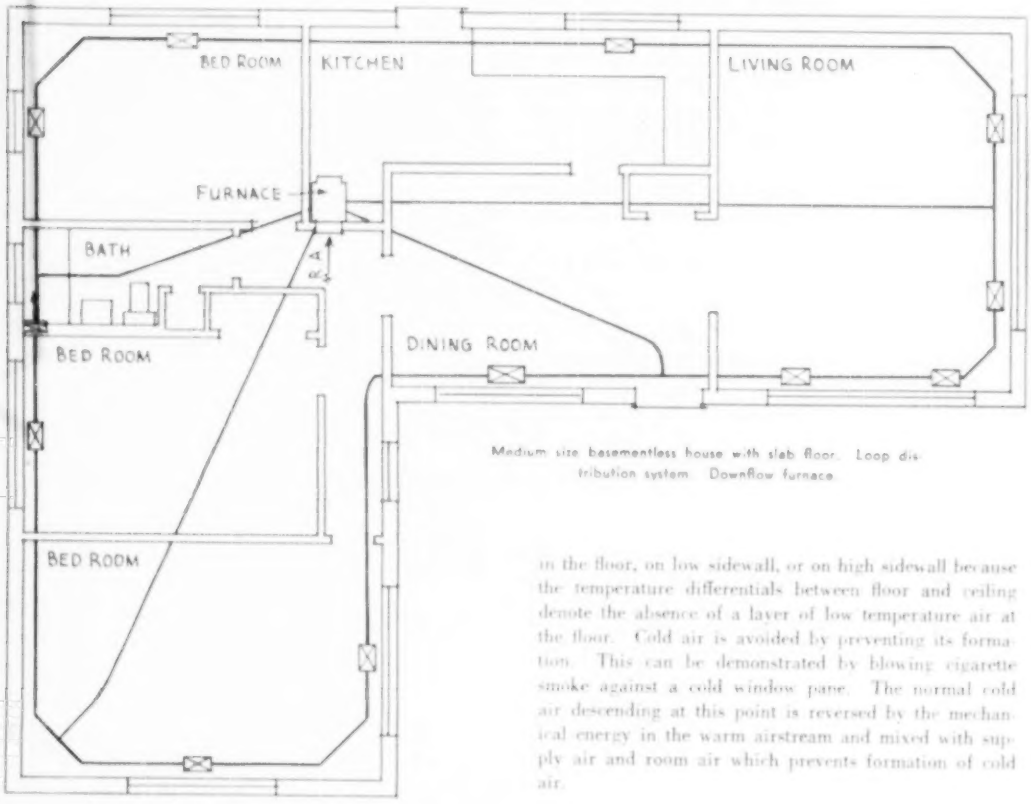


Small house with crawl space. Trunkline and branch distribution system. Downflow furnace.

perature differentials and the need for high room temperatures to feel comfortable are eliminated. Fuel bills are reduced correspondingly.

Each perimeter warm air heating system outlined fulfills its objective for the particular house construction for which it is designed. In each case, the system is designed on the principle: *replace heat that is lost, as fast as it is lost, at the point where it is lost.*

Perimeter warm air heating abandons past conceptions implied in the term: cold air. The return air system is not construed as a cold air collecting system as there is no cold air to collect. Return air intakes may be placed



Medium size basementless house with slab floor. Loop distribution system. Downflow furnace.

in the floor, on low sidewall, or on high sidewall because the temperature differentials between floor and ceiling denote the absence of a layer of low temperature air at the floor. Cold air is avoided by preventing its formation. This can be demonstrated by blowing cigarette smoke against a cold window pane. The normal cold air descending at this point is reversed by the mechanical energy in the warm airstream and mixed with supply air and room air which prevents formation of cold air.

Balancing The Heating System For Indoor Comfort

PART IV

(Conclusion)

P. K. WADSWORTH
Cleveland, Ohio

EVERY heating serviceman sooner or later has a complaint about drafts. Drafts rightly or wrongly are always blamed on the heating system. As a matter of fact, a great deal of public interest in radiant heating can be attributed to heating plants which are not operating properly.

Never approach a problem with the attitude that the homeowner is nothing but a grouch, even if it is true. Sometimes a satisfied grouch is the best advertisement you can have. Always try to remember that people feel they paid a lot of money for their heating system and they expect comfort. If you look at the job long enough and ask enough questions, you may find an answer that you didn't know before. The basic function of a good serviceman is to give people the kind of heat they want.

Sources of Drafts

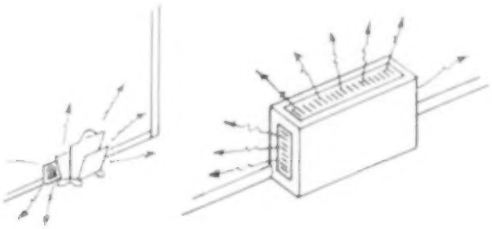
For our purpose we can think of drafts as originating from mechanical causes, cracks, or a cold air wedge.

Mechanical Causes: The fundamental principle in eliminating drafts is that an air stream must not shoot out into any portion of the room normally occupied by persons at rest. A directional flow register will break up this air stream and satisfactorily heat the space without drafts. With adjustment, this type of register will heat an area which was not fully heated before. There is considerable flexibility inherent in the directional flow register and it provides the solution for many problems.

The diffusion provided by the directional flow register accounts for its efficiency in overcoming drafts. It sometimes brings up another problem, however. The homeowner will hold his hand about 3 ft away from the register face and claim that it is not heating. It is then necessary to point out that the air is immediately diffused when it emerges from the register. It is broken up so thoroughly that there is little direct thrust. If the home is comfortable he will have to admit that the system must be operating properly.

It is often helpful to explain to the people in the home how evaporative cooling will result if they place their hand in the air stream from a register. You should be able to get across the thought that it is not essential to have high temperature air coming out of a register to keep the house warm.

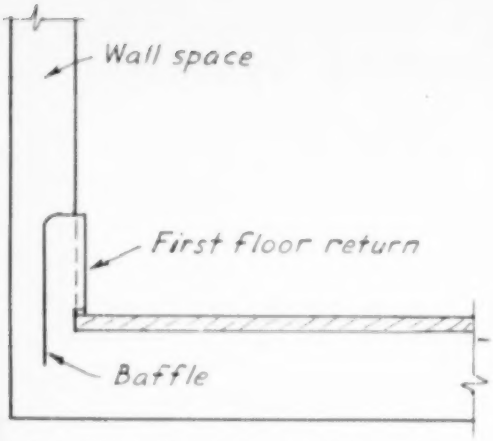
Frequently an object like a magazine rack placed in front of a baseboard register will break up the air flow enough to allow a person to sit close to it in comfort. A small diffusing register which looks like a radiator cover has been developed to fit over a baseboard register. This prevents the air from going directly out into the room.



Poor circulation of air will often be a cause of drafts also. If the air does not circulate properly, cold air will not be taken from the floor and stratification will result.

Sometimes a return grille will pull too much air and create noticeable drafts in a room. This is particularly true in the case of returns directly over or near the furnace. It may be necessary to block off the return that is causing trouble.

Another situation in the return system that can cause trouble is the location of a return grille on the first floor in the same riser as a return on the second floor. The air from the upper floor will have a tendency to drain into the lower grille and reverse the flow of the air. A baffle over the upper part of the first floor register will alleviate this situation.



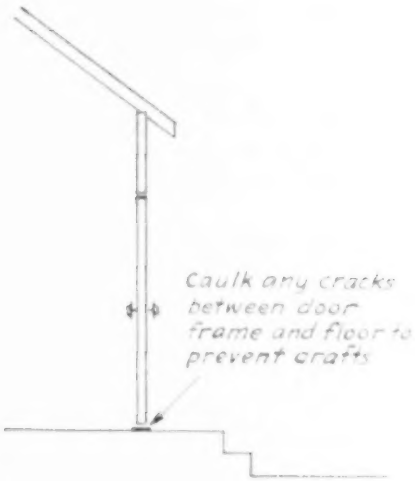
As a general rule, adjustment of the furnace for continuous air circulation will solve most draft troubles.

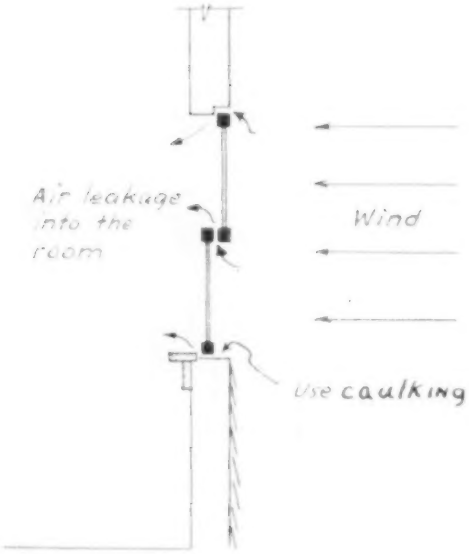
Cracks:

1. If the windows are loose fitting, storm windows or caulking will be required to prevent wind or cold air from coming through.
2. Often there is no header in the return duct at the top of the register. Cold air can come down from the joist spaces and enter the room when the blower is off.
3. Fireplaces which are not closed will allow a downdraft to sweep down the chimney into the room.
4. Failure to caulk around a window or under a door frame often allows cold air to enter, even when storm windows and doors have been installed.
5. Frequently cracks develop along the top of the foundation. When the wind finds an opening like this, discomfort will soon result. Caulking will prevent this draft condition.
6. Cold air from the walls can enter a room through cracks around the baseboard. Putty or caulking will remedy this condition.
7. When drafts originate from a through-wall mail box, a curtain hung just inside the house side of the box will prove helpful. In other cases a sheet metal hood on the outside of the box will solve the problem.
8. Some installers claim they get excellent results in stopping infiltration by connecting a fresh air intake to the return air system. Their argument is that this step puts the house under pressure and that the warm air inside seeks to escape through the cracks. This reverses the air flow and restricts drafts. Higher fuel bills are a probable result, however.

Cold air wedge: The most common draft, and perhaps most difficult to deal with, is the spillage of air down a stairway. To correct this condition, designers have put return air grilles at the bottom of the stairway, and added a warm air register at the top. But this has not always solved the problem. The fundamental reason is that warm air rises and cold air settles.

Very seldom is it possible for the return air grille at the bottom of a stairway to handle all the cold air that sweeps down the stairs. A smoke gun will clearly indicate this. Another hindering factor is that many stairways are placed next to a cold wall. When warm air strikes this cold surface it chills and drops in a continuous draft down the stairway. Insulation of the cold wall will help considerably. Temperature of the insulated wall will be higher and there will be less chilling of the air.





Drafts Under Doors

To add to the stairway problem a certain amount of cold air is usually pulled from beneath doors on the second floor. When a second floor room is not used and the heat is turned off, the door should be closed and the opening at the bottom blocked in some way. A device which will solve this problem is illustrated. The door drop will prevent any drafts under doors as long as the doors are kept closed. This is actually the most satisfactory way of handling these drafts because the drop is there when needed and swings up out of the way when the door is opened.

Draw Drapes and Comfort

Draw drapes can play an important part in comfort. If the drapes are kept closed at night, there will be fewer drafts because the drapes block any cold air that is coming in. During the day the drapes can be left open to allow the sun to help warm the house.

In difficult jobs use of a smoke gun will reveal what is happening to air currents in a room, and thus suggest remedies. You may have an idea of conditions in the room but the smoke gun may show that your idea is not correct. In some cases, it used to be customary to light a number of small candles to indicate air currents. This is a messy and time-consuming job, however. Sometimes a lighted cigarette will give a quick answer to the problem. Some servicemen use a velometer to locate drafts. But as a general rule, the smoke gun is probably the most satisfactory means to determine air conditions and flow.

Door drop

Use of Balance Sheet

In this final article of the series, we print a balance sheet that has proved extremely useful. When this sheet is filled out, is gives an accurate picture of conditions existing at the time of balancing the system. If there are any future complaints about comfort, the

(Please turn to page 136)

WARM AIR BALANCE SHEET

Job name _____ Balanced by _____ Wind direction _____

Address _____ Date _____ Wind velocity None Slight Fairly strong Strong (circle condition)

Sun conditions: None Intermittent Strong

Condition of filters: Poor Fair Good New Outside temperature _____ Blower rpm Before _____ After _____

ROOM	Trial 1			Trial 2			Trial 3			Trial 4			Trial 5			Trial 6		
	Disch. reg. velocity	Return grille velocity	Room temperature	Disch. reg. velocity	Return grille velocity	Room temperature	Disch. reg. velocity	Return grille velocity	Room temperature	Disch. reg. velocity	Return grille velocity	Room temperature	Disch. reg. velocity	Return grille velocity	Room temperature	Disch. reg. velocity	Return grille velocity	Room temperature

Wurtzel Brothers Plymouth & DeSoto showroom in Brooklyn. The heater is in the back, discharging heat direct to the garage area. From one of the outlet louvres heat is fed to the duct that runs around the showroom wall.

Warm Air Unit Heats Auto Salesrooms And Garages

E. M. TARNOFF*

A FEW weeks ago a truck backed up to Wurtzel Brothers Plymouth and DeSoto showroom in the Brighton section of Brooklyn and two workmen unloaded a metal cylinder about 30 in. in diameter by 10 ft high with an auto-body finish and smart, aluminum trim.

Compartment Built

In the parts and service department, just to the rear of the showroom, the cylinder was positioned in a compartment built of cinder block. Workmen quickly connected the cylinder to the electric power circuit and a fuel oil line and then left. In a few hours, a sheet metal worker finished installing a duct that ran around the wall of the showroom, and Wurtzel Brothers had a new, complete heating system for cold weather and a high pressure blower to ventilate the premises in summer.

Problem of Glass

This Wurtzel Brothers' installation, as well as the others discussed in this article is interesting because the proper heating of auto showrooms has always been a problem with many angles. The large areas of glass found in showrooms "lose" a great deal of heat. Then too, it is desirable to heat the maintenance shops with the same system as used for the showrooms, and the shops have large doors that are opened and closed many times in the course of a day. Add to these factors the need for ventilation in the shops, and there is a heating problem that can be expensive to solve. Hence the interest in the Wurtzel method. The same type of equipment was

*Manager, Thermoblow Division, Pyle-Daniel Corp.

used at Talimini's Oldsmobile service garage at Haverstraw, and at Ebert's Truck and Farm Equipment showroom at Lansdale, Penn., and Rooney's Nash agency at Buffalo. Let us see how well the problem of heating showrooms had been answered by this heating unit.

Like a Home Unit — But Larger

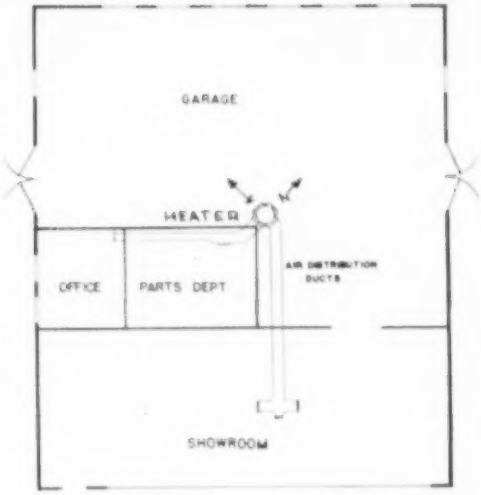
The unit in each case was a direct fired heater, similar to the forced air furnace used in so many homes, but of much larger capacity. Direct fired simply means that these units heat the air by direct transfer from flame to air stream through a single thickness of metal, instead of producing steam or hot water to do the job.

Operation of Heater

A powerful fan takes cool air in at floor level and forces it up through the unit, scrubbing every foot of heat transfer surface, and discharges it at the top at 5,000 cfm. This method is simplicity itself. It has proved to be economical and satisfactory when used in many homes. It's only recently, however, that units large enough for garage or showroom use have been made available.

The units described in this article are manufactured in two sizes, 300,000 Btu per hour and 550,000 Btu per hour.

In terms of floor space, 300,000 Btu per hour will heat approximately 3,500 sq ft and 550,000 Btu per hour will take care of up to 6,500 sq ft.



At Talimini's Oldsmobile garage and showroom, Haverstraw, N. Y., the heater distributes warm air direct into the garage area, without the use of ducts.

At the Ebert Motor Co., Lansdale, Penn. the heater is placed in a small, cinder block compartment, with ducts leading into the office and shop areas.

Units are Fully Automatic

At Talimini's Garage and Oldsmobile showroom, A. Talimini pointed out that he bought his unit for about one third what a steam plant would have cost him and that its operation is a great deal more economical.

One reason for this is that direct fired heaters are fully automatic. A thermostat controls a switch, and the switch controls first the burner and then, after heat is available, it turns on the fan.

As the picture of Talimini's garage shows, these units do not require ductwork, if the area to be heated is unpartitioned and unobstructed. If it is desired to pipe off heat for a showroom, as was done at Wurtzel Brothers, plain sheet metal ducts may be used. In no case is an attendant necessary.

Fire Regulations

Fire regulations vary considerably in their acceptance of this new type of equipment. Sometimes local fire authorities want the unit to be housed in a compartment as shown in photos of Ebert Motor Co. In other cases, a sheet metal shield, 4 ft high around the base of the unit is sufficient. These self-contained heaters carry the approval of the Fire Underwriter laboratories.

Whatever the characteristics of the installation may be, the unit is a standard package, shipped from the factory with all component parts in place, ready to connect to fuel oil or gas lines and an electric power circuit. The method of distributing the heat is taken care of when the unit is installed.

Important Economy

Auto dealers who have installed direct fired, warm air heaters seem to agree that they are economical to purchase and operate. Each unit has all the essentials of a heating plant in a neat, attractive casing and is automatically operated.

Another advantage is that in warm weather it is possible to turn on the fan and get fine ventilation for a showroom or garage.

Warm Air Heating Preference Indicated By New Department Of Labor Survey

A NEW TYPE of service has been started by the Bureau of Labor Statistics of the Department of Labor. Surveys have been made of a number of large metropolitan areas in different regions of the country. These surveys have attempted to determine the characteristics of the typical house built in each area. Included in the survey is information on the type of heating system installed in houses started.

The type of heating system used in houses surveyed is our primary concern. It is also interesting to note some popular features to give an idea of the average house.

The typical house started in the Atlanta, Ga., metropolitan area during the third quarter of 1949 was a 1 story, detached, frame dwelling having 4 rooms. It had a floor or wall furnace and a porch, but generally did not have a garage or fireplace, and rarely an attic suitable for finishing into an extra room.

Floor plans, on the average, allowed 700-900 sq ft for about half the new single family houses. From 900 to 1100 sq ft were characteristic of about one third of the houses. Only a fifth had 1,100 or more sq ft of floor area. One house out of five had a basement and a slightly larger proportion had a utility room.

Atlanta, Ga. — Third Quarter, 1949

Total starts		1,710
Heating systems	No.	%
Conventional warm air (ductwork)	190	11
Floor or wall furnace	1,050	59
Space heater	510	28
Panel and other	50	2

Fourth Quarter, 1949

Total starts		1,900
Conventional warm air (ductwork)	260	14
Floor or wall furnace	1,320	69
Space heater	230	12
Panel and other	90	5

Moving up to Boston, Mass., the Cape Cod cottage of frame construction is found to be the most popular house design. Generally these homes have a full basement, 1 bathroom, 4 rooms on the ground flood and an expansible attic.

Four room houses accounted for 57 per cent of all single family dwellings put under construction and averaged about 780 sq ft in floor area. Floor plans for the 5 room homes (not quite a fourth of the starts) averaged about 840 sq ft. Larger homes were more spacious. The average 6 room house (11 per cent of the total) had about 1,420 sq ft of floor space.

Boston, Mass. — Third Quarter, 1949

Total Starts		1,960
Heating systems	No.	%
Conventional warm air (ductwork)	880	45
Hot water	430	24
Steam	250	12
Panel (approx. 1/3 warm air; 2/3 hot water)	340	17

The typical home started in the Chicago metropolitan area during the last half of 1949 was a 1 story brick, detached house, having either 4 or 5 rooms and approximately 900 sq ft of floor space. About 70 per cent of the single family homes had basements and one fourth had a utility room. Less than 20 per cent of the houses had garages and porches.

Chicago, Ill. — Third Quarter, 1949

Total starts		6,640
Heating systems	No.	%
Conventional warm air (ductwork)	5,130	77
Panel (mostly warm air)	590	9
Remainder of systems divided among:		
Hot water		
Steam		
Floor or wall furnaces		

Fourth Quarter, 1949

Total starts		6,530
Conventional warm air (ductwork)	4,960	75
Panel	420	6
Hot water	650	10
Remainder:		
Steam		
Floor or wall furnace		

Majority of the single family homes started in the Cleveland metropolitan area were frame, 5 room houses with a basement and floor area ranging from 800 to 1,000 sq ft. Warm air heating was the dominant factor in the heating field. Many 1½ story units were started and these houses had expansion attics. About 50 per cent of the new homes had garages, many attached.

Cleveland, Ohio — Third Quarter, 1949

Total starts		2,690
Heating systems	No.	%
Conventional warm air (ductwork)	2,130	79
Panel	470	17
Remainder:		
Hot water		
Steam		
Floor or wall furnaces		

Fourth Quarter, 1949

Total starts		2,700
Conventional warm air (ductwork)	2,320	86
Panel	140	5
Hot water	180	7
Remainder:		
Steam		
Floor or wall furnaces		

Moving down to Texas in the Dallas metropolitan area the survey found that the typical house in this region was a 1 story, 5 room house which seldom had a porch. An increase in the number of garages was noted in the last quarter of 1949. A space heater was usually found to be the favored method of heating.

Floor plans allowed about 700 to 900 sq ft in three fourths of the houses surveyed.

Dallas, Texas — Third Quarter, 1949

Total starts		2,220
Heating systems	No.	%
Conventional warm air (ductwork)		
Floor or wall furnace	490	22
Space heater	1,470	68

Fourth Quarter, 1949

Total starts		1,960
Conventional warm air (ductwork)	140	7
Floor or wall furnace	630	32
Space heater	1,170	60

The area around Detroit, Michigan, showed a preference for the small, economy home during the last half of 1949.

The typical house was a detached frame structure having 5 rooms, all on one floor, with about 810 sq ft of floor space. This dwelling had a basement and usually a conventional warm air heating system, but did not have an expansion attic, porch, garage, or fireplace.

Detroit, Mich. — Third Quarter, 1949

Total starts		10,200
Heating systems	No.	%
Conventional warm air (ductwork)	9,250	91
Remainder:		
Panel		
Hot water		
Steam		

Fourth Quarter, 1949

Total starts		9,210
Conventional warm air (ductwork)	8,340	91
Panel	340	4
Floor or wall furnace or space heater	430	5
Remainder:		
Hot water or steam		

The characteristic house of the Los Angeles, Calif., metropolitan area started in the third quarter of 1949 was a 1 story detached structure, had 5 rooms, about 900 sq ft of floor space, and was of stucco over frame construction. It had 1 bathroom, a 1 car garage, but no fireplace, basement or utility room.

Los Angeles, Calif. — Third Quarter, 1949

Total starts		13,610
Heating systems	No.	%
Floor or wall furnace	10,930	80
Space heater	1,270	9
None	840	6
All other	650	5

(Panel heating was found in a few cases)

A change was noted in characteristics of the typical dwelling in the New York metropolitan area from the third quarter of 1949 to the fourth quarter.

During the third quarter the house most frequently built was a 1½ story, detached home of frame construction with 4 rooms. This type of house averaged about 860 sq ft of floor area.

The fourth quarter saw a change to a 1 story, ranch type house of frame construction with 5 rooms and an expansion attic. The average house started during this period provided about 1,000 sq ft of living space.

New York, N. Y. — Third Quarter, 1949

Total starts		14,460
Heating systems	No.	%
Conventional warm air (ductwork)	3,010	21
Hot water	5,930	41
Steam	2,570	18
Panel	2,660	18

Fourth Quarter, 1949

Total starts		14,100
Conventional warm air (ductwork)	3,550	25
Hot water	5,330	38
Steam	2,890	21
Panel	2,190	16

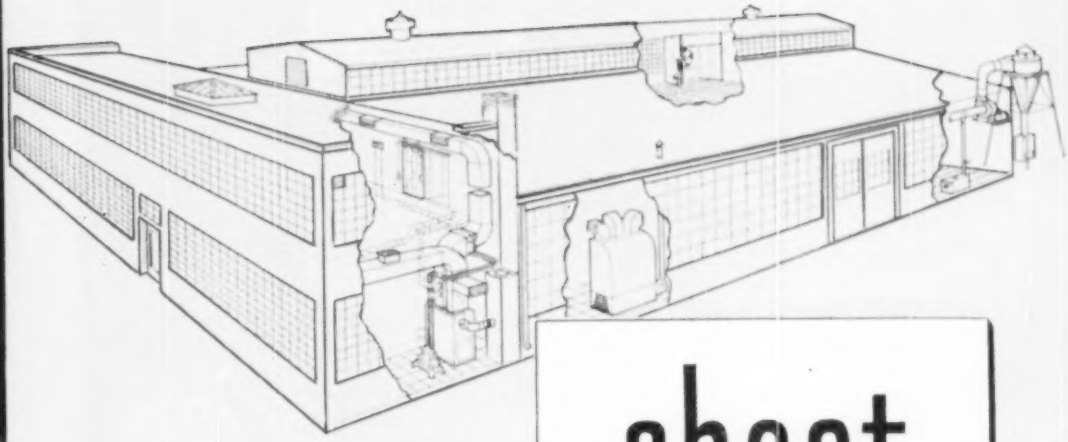
The metropolitan area including Philadelphia, Penn. and Camden, N. J., varied from the areas listed above in the nature of its typical house. Here the typical single family home was a 2 story row house of brick construction with 6 rooms. Floor space in about half of the new homes started in the third quarter of 1949 was from 1,000 to 1,400 sq ft. Only a third of the homes had less than 1,000 sq ft of floor space.

The final quarter of 1949 saw an increase in the number of detached single family homes. Floor space remained about the same.

Philadelphia-Camden — Third Quarter, 1949

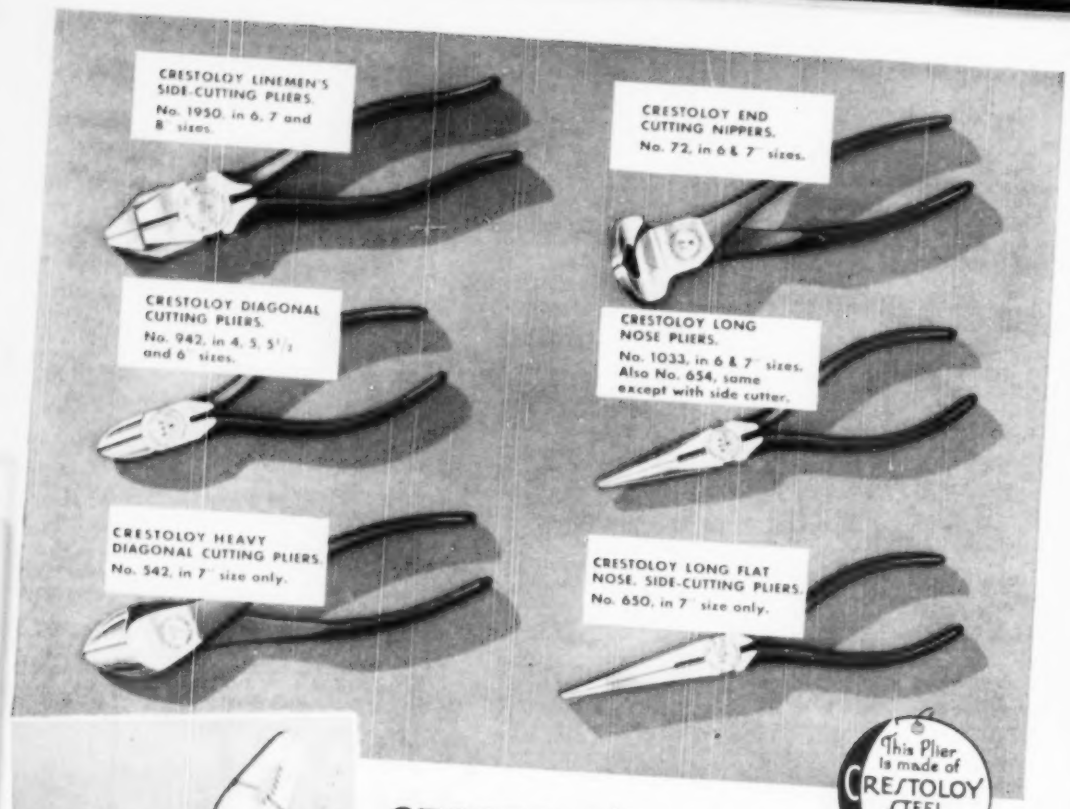
Total starts		4,610
Heating systems	No.	%
Conventional warm air (ductwork)	3,710	82
Hot water	650	14
Other	150	4

(Please turn to page 142)



sheet metal *Section*

Design • fabrication • installation of sheet metal products

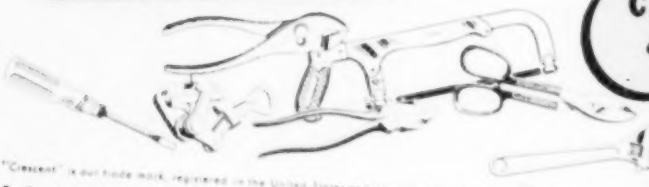


This Plier is made of CRESTOLOY STEEL and has tested 100% satisfactorily

CRESTOLOY PLIERS

are individually tested!

Crestoloy Pliers take all the guesswork out of plier buying, because Crescent has taken all the guesswork out of plier making. Rigid specifications establish the material, design, workmanship, tests and inspection of these better tools. Strict adherence to these specifications is maintained by continuous tests and relentless inspection of the *individual* tools. Every plier carries the Crestoloy tag certifying that it has been individually tested.



CRESCENT TOOLS
Give Wings to Work

Sign of the Artisan
Symbol of Excellence

"Crescent" is our trade mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

Color Dynamics In The Sheet Metal Shop

The brightness of the shop is evident in this photo.

LAWRENCE E. GICHNER
Gichner Sheet Metal Works
Washington, D. C.

Many tests have shown that color has a definite psychological effect on those exposed to it. Proper use of color in the shop makes it a pleasant place to work and increases efficiency.

"Good supervision is the answer to today's profits" says Charles P. Blouin. "And the answer to the phenomenal growth of Charles P. Blouin, Inc., of Cambridge, Mass., is sound and intelligent leadership. Their recently completed new plant is one of the most modern in New England, and an excellent example of the use of color dynamics.

Dynamic color reduces eye strain, makes heavy things appear light, dark things bright and creates a working atmosphere pleasant to the workers. Color dynamics makes rooms seem more spacious, pleasing to the eye, contributes to the health and efficiency of the employees. Originally developed to increase efficiency in industry, color dynamics is winning acceptance in many fields where eye fatigue is a factor. Laboratory tests prove that color on a machine, on a wall, or in a traffic lane has a marked influence on a worker's morale, his rate of production.

Color engineers exploring the psychological and physiological reactions and benefits find correct color lifts spirits, improves quality and quantity of production, reduces accidents and contributes to the health and efficiency of employees.

Mr. Blouin has worked out the following effective color scheme that is most attractive in his plant.

1) Stationary machinery is painted green.

Outside view of the plant

The drafting room is also a cheerful place to work. The cabinets at which the men stand are specially made to hold blue prints.

2) Moving equipment is orange
3) Fire equipment is red
4) Lower walls are dark green
5) Upper walls and ceiling light green

Office walls are mahogany veneer with a green tint on the upper surfaces. Offices are all insulated, sound proofed and air conditioned. The modern furniture is all a light gray finish with large special filing drawers for blue prints, tracings and drawings.

"Since we painted our plant" says Mr. Blouin, "its attractive appearance has received many enthusiastic compliments not only from our staff but customers and suppliers as well."

Good Location

The plant is located on the corner of a busy thoroughfare and noticeably advertised by large signs. It is accessible from two streets and three large entrances. A three ton crane runs the entire length of the shop. Bundles of steel picked up from stock piles at one end can be easily set down at the other.

A large shed area adjacent to the plant is similarly served by a five ton crane. Under this roof finished material can be assembled, stored or painted. A portion of land, not under roof, will be used for future expansion.

Mr. Blouin's two sons are also associated in the business with him. Graduate engineers, they do both estimating and supervising.

The firm does jobs within a thousand mile radius of Cambridge.

Appearance Important

Mr. Blouin believes in the impressiveness of cleanliness and his ideas are well exemplified in the fine appearance of the office and shop. He has decorated both his office and his home with attractively original smoking tables made of stainless steel, polished copper and aluminum. They are smart, trim, and eye catching.

The floor of the shop is very easy on the mechanic's feet and is covered with macadam flooring, the material used for city streets.

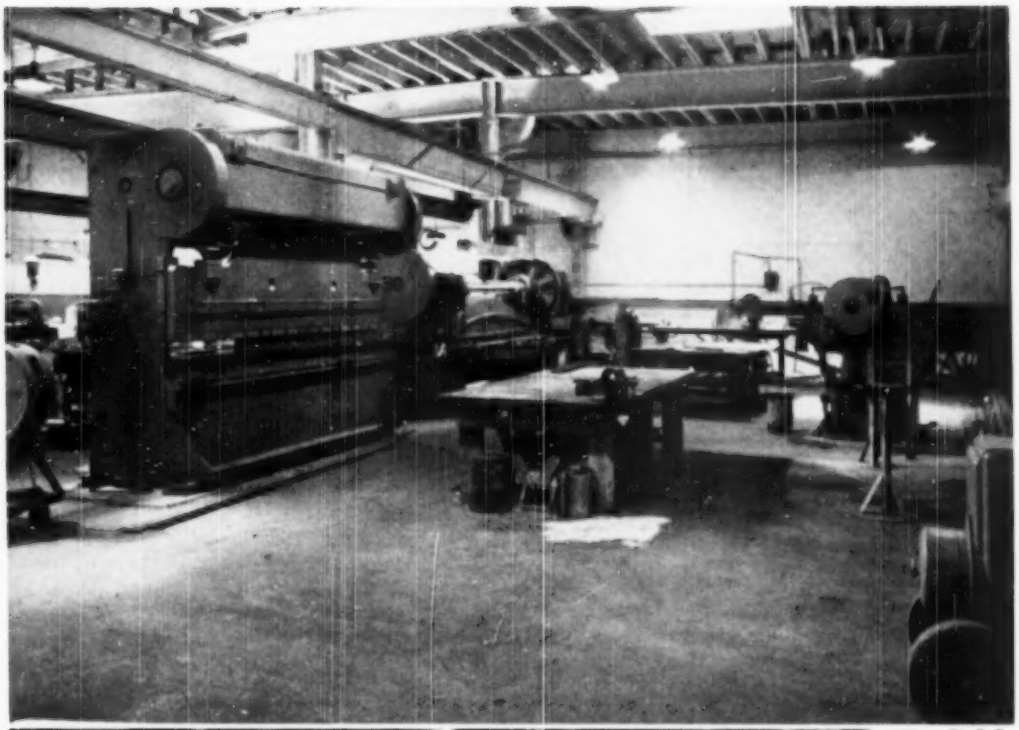
Mr. Blouin says, "I believe in a small volume with a good profit. I believe in a volume of business that I can control, executed by my regularly employed mechanics."

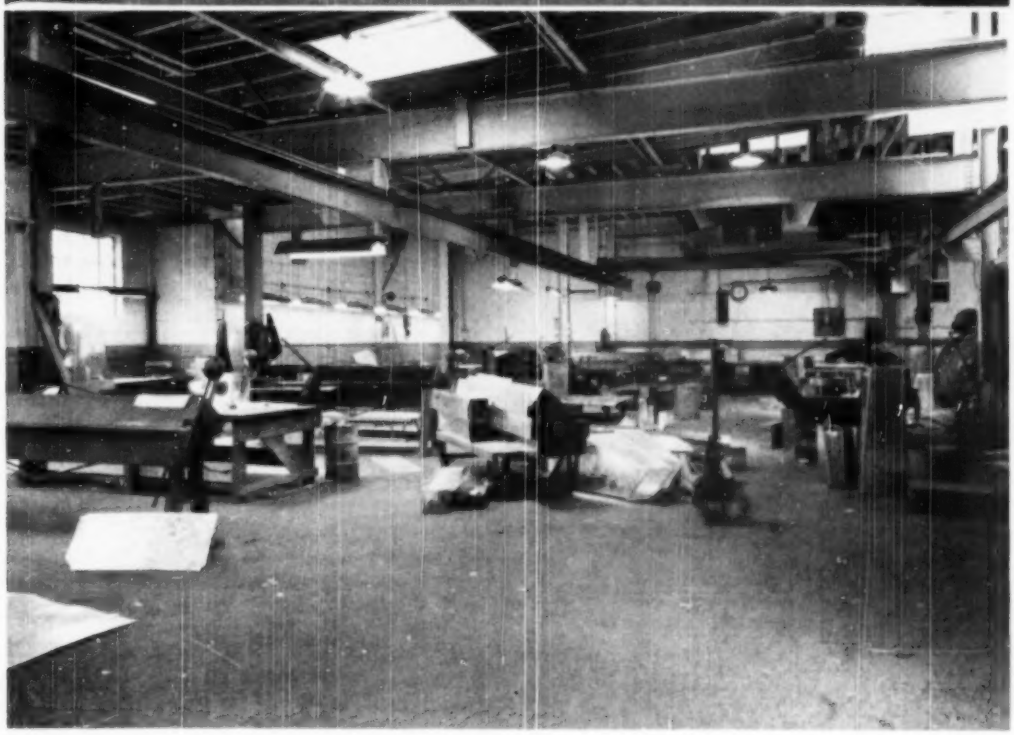
Outside supervisors regularly check their jobs once a week, once a day, or once an hour depending on how well the work is going.

That Charles P. Blouin Inc., Sheet Metal Work, Ventilation and Industrial Contractors, are a fine firm to work for is substantiated by the fact that ten mechanics who originally started in business with Mr. Blouin are still associated with him. In the years that they have been together, none of these mechanics has lost any time due to the company having no work for them.

Photos on opposite page.

The two photos on the opposite page give a more comprehensive view of the Blouin shop. The color scheme calls for a darker color at a low level with the upper parts of the walls and the ceilings a lighter shade.





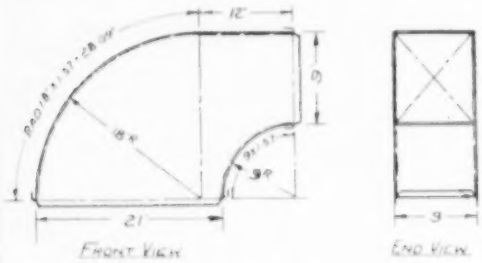
Pattern Development For

Compound Transition Elbow

HUGH B. REID
Detroit, Mich.

THE November issue of AMERICAN ARTISAN presented to its readers a pattern development solved by simple mathematics and stated that another related problem would follow.

Repetition is an established method of teaching. Solving an isolated problem is often a tedious task because of the unfamiliar data that must be gathered and studied. When a second related project is presented the knowledge gained from the previous work can readily be applied, thus cutting down the time required to complete the work. Repetition in modern industry has resulted in volume production at low cost. To introduce the subject in the previous article a 90 deg rectangular elbow was used as an illustration. Another introductory problem follows.

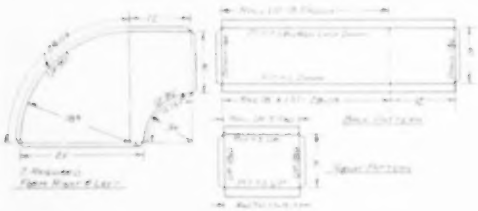


Lay out the patterns for the 90 deg transition rectangular elbow shown.

The formula for finding the distance around the back and throat radii of a 90 deg elbow is radius multiplied by 1.57.

To lay out the patterns proceed as follows:

These pattern layouts can be worked out by the shop supervisor, recorded on working sketches and passed on to the apprentice or second class mechanic. The compound transition elbow is practical only in a tight spot where it would be extremely difficult to make a joint or where appearance would be a major factor. The Pittsburgh lock seam would be hand formed throughout, an operation that would add to the labor cost.



Formula for Layout

There is a mathematical formula for the pattern layout of all rectangular elbows the use of which will be time saving.

Following is a step by step solution for the compound transition elbow.

To lay out pattern *A*:

a) Draw the line *EF*. From point *E* draw the line *EG* perpendicular to line *EF*.

b) From point *E* on line *EF* locate the given radii $\frac{1}{2}$ in. and 1 in. as shown on end view.

c) From point *E* as center and $\frac{1}{2}$ in. radius draw a 90 deg arc intersecting line *EG* at *U*.

d) From *U* measure the given width of the elbow which is $\frac{1}{2}$ in. and marked *G*.

e) From point *E* on line *EF* as center draw a 90 deg arc and tangent to the arc draw a line $3\frac{1}{4}$ in. long intersecting line *EG* at *G*.

f) The length of metal required to stretch around the back of the 90 deg elbow is calculated by multiplying $1\frac{1}{4}$ in. radius by 1.57, thus 1.25 x 1.57 = $1\frac{3}{4}$ in.

g) From line *EF* measure off $1\frac{3}{4}$ in. plus the added straight length which is $\frac{7}{8}$ in. as shown on the front view drawing.

h) Add allowances for joints, Pittsburgh lock seams, and form to required shape.

To lay out pattern *B*:

a) Draw the line *RS*. From point *R* draw the line *RT* perpendicular to line *RS*.

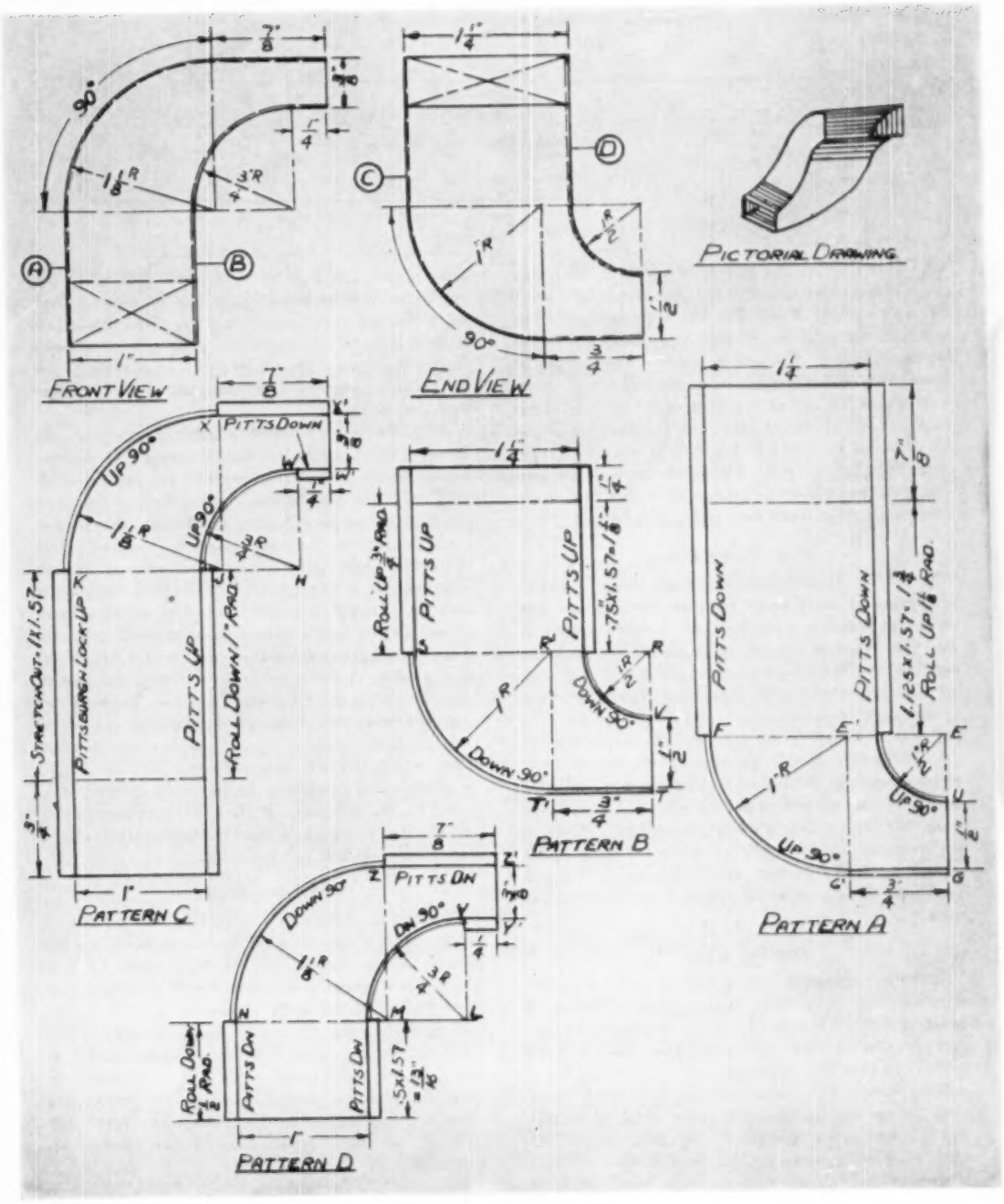
b) From point *R* on line *RS* locate the given radii $\frac{1}{2}$ in. and 1 in. as shown on end view.

c) From point *R* as center draw a 90 deg arc intersecting line *RT* at *V*.

d) From *V* measure the given width of the elbow, which is $\frac{1}{2}$ in. and mark *T*.

(Please turn to page 140)

Sheet Metal Pattern



Die Design For Sheet Metal Forming

ERNEST ZIDECK
Sheet Metal Consulting Engineer

WEEK by week the pattern of events in the United States seems to follow the same trend that marked the early days of World War II. More and more raw materials and products of industry are being earmarked for the military. Civilian production shows signs of diminishing and becoming more difficult.

At a time like this, it is important for the sheet metal shop in our industry to give some thought to a course of action to be taken if the defense emergency continues its present trend. Restrictions may be imposed which will make it almost impossible to stay in business with only civilian work as a source of revenue.

War Production

World War II saw many sheet metal shops convert to production of sheet metal parts or products for war use. Our industry established an excellent record in this type of work because of its familiarity with the handling and fabrication of sheet metal. It may soon be necessary again for the sheet metal industry to turn to war work.

For this reason we are bringing you this article on the manufacture of dies for mass production of sheet metal stampings. While the normal peacetime work of the sheet metal shop does not include much production work, war brings about a change in emphasis. Military requirements tend to consist of orders for many pieces of one particular product, rather than many types of products. It is well to be prepared for this type of work.

Making Dies

In the accompanying drawings are shown the various steps necessary to produce sample pieces according to which steel dies are ordered. It is a mistaken idea, for example, that all work in the production of automobiles is done by dies in huge presses. It is surprising when walking through an automobile factory's sheet metal shop to see all the common sheet metal tools and small machines in operation. Squaring shears are used to produce accurate blanks for the stamping presses. Circular and rotary shears do some operation on about half the parts that go into the assembly of an automobile. The large stamped parts, such as the top, cowl, rear deck, etc., are trimmed on bandsaws. Trimming dies are used on smaller parts only. Brakes are utilized in forming straight line parts with no crossing radii. Stamping or deep drawing dies are relatively few and when required they are designed by the processes described below.

All parts are minutely detailed, inspected, and then drawn again in assembly. But no designer or engineer would run the risk of releasing dies for production on drawing board calculations alone. Many sheet metal processes cannot be calculated in advance. Some other means of forming the metal might be required. This alternate process might disrupt other parts of the calculations. If it were possible to build a complicated assembly of many parts just by calculations, experimental engineering would have been abandoned long ago. It is accepted practice, however, to produce a trial model of a product or assembly before ordering the dies to make it. When this trial model has been accepted and approved, then the production of the dies can begin.

In the manufacture of some assemblies there is often a part which has not changed from a previous design. In this case it is possible to use one of the old parts as a model for the new dies. If the product or assembly is entirely new to the shop, then the entire process must start from scratch.

Patterns Made

First step in production is to turn the blue prints over to the pattern makers, who then make solid wooden patterns of the parts which are to be made by dies. The wooden pattern is then inserted in a metal frame, usually about $\frac{3}{4}$ in. thick. Plaster of paris is poured into the frame, over the wooden form, as shown. This frame is about $\frac{1}{4}$ in. larger than the wooden pattern so that the pattern and metal mould will slide out easily. To allow for correction of the plaster model, the wooden pattern is made $\frac{1}{8}$ in. smaller. This leaves excess material on the plaster model which is then fitted to accurate templets.

When the plaster model has been checked to correspond to the templets (one half the model or form is

MAKING STEEL DIES FOR SHEET METAL PARTS

Fig. 1 View of form (Cut on line A-A)

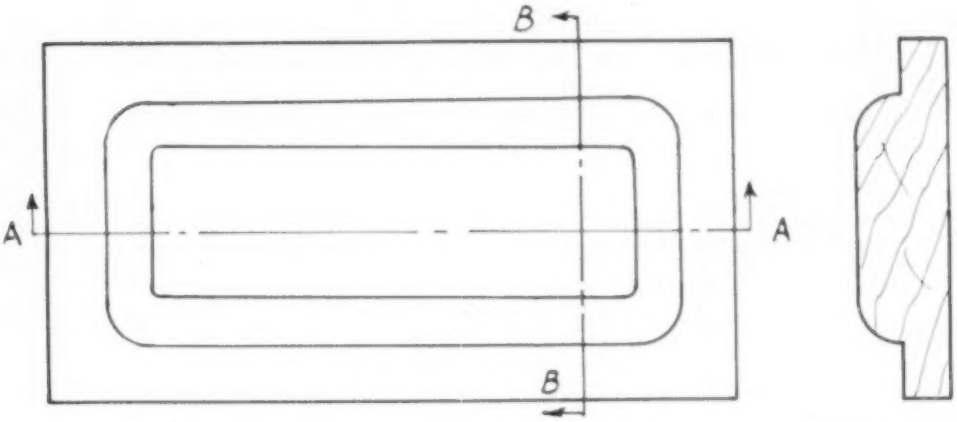


Fig. 2 Plan view of form

Section B-B.

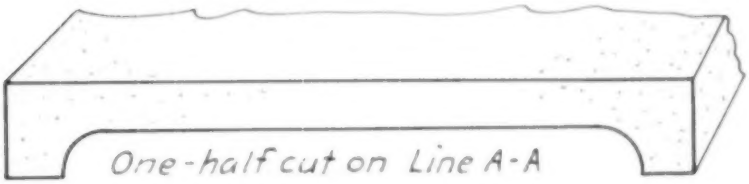


Fig. 3 Plaster of Paris form

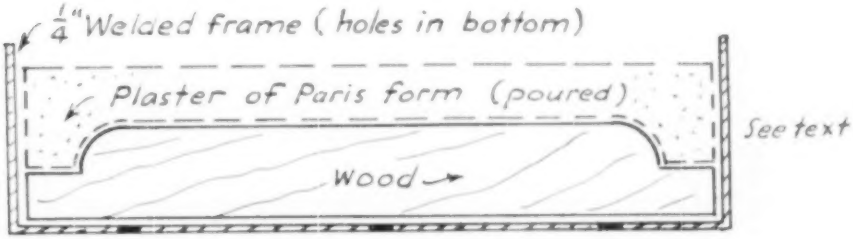


Fig. 4 Section on Line A-A

SHEET METAL FORMING

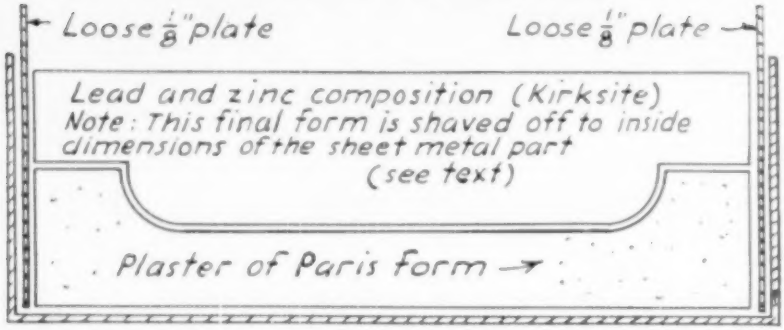


Fig. 5 Cross cut through forms in frame

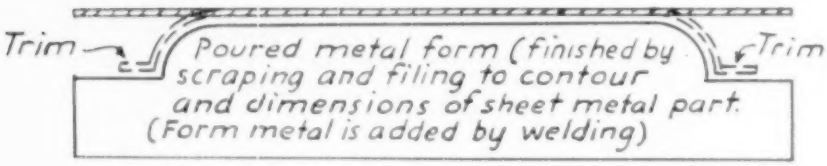


Fig. 6 Sheet is clamped over form

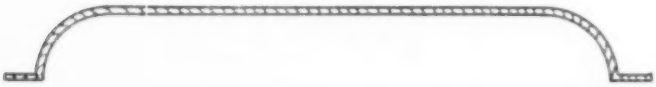


Fig. 7 Section on Lines A-A, B-B; Fig. 2 of sheet metal part completed for tryout and eventual repair of form.

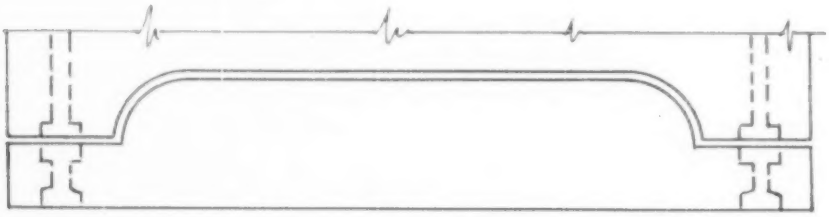


Fig. 8 Steel dies, male and female made after accurate sheet metal part was produced.

shown in Fig. 3) it can be inserted into a frame and used to produce a metal form. Kirksite, a lead-zinc alloy is frequently used for this purpose. Sheet metal spacing plates of $\frac{1}{8}$ in. thickness are loosely inserted around the plaster mould. These plates assist in removing the forms from the frame (Fig. 5).

Die Accuracy Checked

Now the metal form or die reproduces closely the corrected plaster of paris form (in the reverse). This metal form is checked with templets for contours and dimensions. Surplus metal is shaved or filed off. Kirksite welds very easily, without heat diffusion. Where necessary, metal is added (welded in) to correct the form. This metal form is then used to make sample pieces. A metal sheet is overlaid with a suitable size hardwood board, and this is clamped to the underside of the form. Hardwood wedges are used to hammer the sheet down over the form. This wedging is done progressively, on all sides and corners, taking only about $\frac{1}{8}$ in. of the sheet at a time. The sheet will then fit tightly over the metal die. Steel hammers should not be used in this forming since they might stretch the metal. This sheet formed over the die is larger than the required piece and excess metal is trimmed off. Templets are provided as a guide for this trimming.

Wedging the sheet over the metal form is demanding work. First of all, the sheet must be securely clamped to the form. But the most important factor in the operation is the gradual bending of the sheet over the form. This must be carefully checked during bending. Flaring will be quite pronounced in the corners of the die. A mallet is used for pounding down the sheet.

This wedging must be done at a slow and careful pace because the sheet must bend uniformly around the die. Hurrying the work would probably result in a sheet that fitted the form too loosely and was worthless.

The process described above is only the beginning of the work. The sample piece coming from the form might not measure up to requirements or might not fit into the overall assembly. When testing the piece for strength, it might become apparent that a heavier gauge of metal would be required. If the sample is rejected for any reason, the process is repeated.

Fitting and correcting is continued in automobile production even after the pilot model cars (built by hand) have been tested on the proving ground. Only after exhaustive tests have been made and the design frozen are the dies ordered. Once the dies are made to the specifications developed by the foregoing steps, output of the stamped parts is at an extremely high rate and each part fits flawlessly into its proper assembly.

Where a product of assembled parts is to be manufactured in quantity by expenive steel dies it takes months to prepare for ordering the dies. Draftsmen draw and redraw the part until it is accepted by the product engineering department. They also design gauges

(Please turn to page 144)

National Apprenticeship Contest

FIRST AWARD: $200.00, *SECOND AWARD*: $125.00, *THIRD AWARD*: $75.00

Contest begins: February 1st, 1951, *closes*: March 15th, 1951.

Conducted by: The National Joint Sheet Metal Workers Apprenticeship Committee.

Sponsored by: Sheet Metal Contractors' National Association and The Sheet Metal Workers' International Association.

This contest is open only to first and second year apprentices, all apprentices who have not completed two years and not more than 4,000 hours of apprenticeship training before March 15, 1951, are eligible to enter contest.

All contestants are requested to make their entries through their local joint apprenticeship committee, by sending their name and address and the name and address of their employer to the local committee as soon as possible.

Each local committee should make their request to the Secretary of the National Joint Apprenticeship Committee, Joseph J. Kaberlein, 5911 N. Mobile Avenue, Chicago 30, Ill., as soon as possible and obtain the number of questionnaires and drawings of the article that will be made by each contestant. Each local joint apprenticeship committee is requested to conduct a contest among their apprentices and mail the actual fitting made by the winning contestant to Secretary Kaberlein, postmarked not later than March 15th, 1951.

In localities where there is only one, or a small number of apprentices and there is no joint apprenticeship committee, the apprentices who are desirous of entering the contest may select one or more local contractors and an equal number of journeymen, preferably officers of the local union. These men will act as a committee for conducting the local contest and select their winning entry for the national contest.

In addition to cash awards, each winner will receive a medal and a certificate.

The winners from the various localities will compete for the grand national prize awards. All fittings will be judged by their neatness, accuracy and general workmanship. The decision of the judges will be final.

Attention to all Apprenticeship Committees

Plaque Award: To the Joint Apprenticeship Committee which has distinguished itself as the committee having made the most progress in promoting and training of apprentices during the year ending March 15th, 1951, will be awarded a plaque in recognition of a worthy and distinguished service to the sheet metal industry.

Stainless Steel Remodeling Job Helps

HARRY L. SPOONER
Peoria, Ill.

THE enlargement and complete remodeling of the Montefusco Heating and Sheet Metal Service building at 1519-21 S. Adams St., Peoria, Ill., is a silent commentary on the success of this enterprising firm.

Ten years ago Anthony Montefusco started working for various heating concerns as a serviceman. The next year, 1941, he entered the he g service business for himself, working from his residence. He gradually worked into the new furnace replacement business, which also necessitated sheet metal work.

By 1947 he had built up a business that demanded more room and moved to his present quarters. The only building he could secure was an old frame structure, part of which had been a two-story residence. The upper part was still being used for this purpose. Back of the building was a series of seven garages and these were also occupied as residences.

When he bought the property, he secured the removal of all families renting the places of residence.

About a year ago he started to improve the property. The building had a frontage of 33 ft., divided into two store fronts. He had an office in one section. The other section housed the sheet metal shop, which also took in the part back of the office. Along one side was a 12 ft driveway.

Where the driveway had been, he built an addition

Here is a view of the interior of the salesroom. The burners set up at the rear wall are operated to give actual demonstrations.

Sheet Metal Contractor's Business

to the building with a concrete block wall running back 32 ft. At the same time he tore down a one-story section at the rear of the two-story building and rebuilt this with a similar wall. In the front of this addition he built a private office with an engineer's office behind it, the two taking up 20 ft of the front area. The 62 ft back of these offices became a part of the sheet metal shop.

Without stopping operations, the part of the shop occupying the front of the two-story section was moved into the addition and the newly-emptied space was made into a sales and display room.

Outside of the building was improved at the same time. First, a canopy was built over the frontage. The entire front was covered with corrugated aluminum sheets and trimmed with stainless steel. All metal work was done by the shop crew as they could get time. This new front is thus very appropriate and good advertising for a sheet metal contractor. The entire place was re-decorated at the same time other improvements were made.

The new display and salesroom is very well appointed. In front is the display room. It has a rubber tile floor and fluorescent tubes for lighting. It has a large front window so the entire floor display is visible from the street. This display consists of 10 models of furnaces, one of each model carried. Also stocked are gas and oil space heaters, stokers and water heaters.

Two special features mark the display room as out of the ordinary. One is that baseboards and window and door casings are all covered with stainless steel. The other is a stainless steel canopy on one side. The

Here is a view of the shop. The door at the right allows the trucks to be housed in the shop.

canopy covers three steel stands on which are mounted operating oil and gas burners to give actual demonstrations.

A table and several upholstered chairs for the convenience and comfort of prospective customers are provided.

Back of the display room are three offices—one for the sales manager, one for another salesman, and a larger one for general use of the sales department.

The shop is L shaped. It is 50 ft wide at the rear. One section is 62 ft deep and 31 ft wide at the front. The other part is 42 ft deep with a 19 ft frontage. The shop has a concrete floor throughout and is lighted by fluorescent tubes. It has as much window space in the rear as it was possible to get. A large overhead door allows the company's 3 trucks to enter the building at night.

Well-equipped Shop

Equipment consists of 6 work benches (there will be 2 more); a 10 ft brake; a 4 ft brake; a 30 in. squaring shear; bar folder; 2 sets of slip roll formers; bench grinder; drill press; cleat bender; small electric shear; and all types of bench tools and equipment. A large stock of sheet metal is carried, in stainless steel, aluminum and copper. At present there are 2 steel racks for sheet storage and another one will be installed.

A large stock of furnace and stoker parts, gutter, pipe, fittings, etc. is also carried. Much of this is stored on the second story. The garages at the rear are also used as storage space for furnaces, stokers, water heaters, and heavy supplies.

In addition to heating and sheet metal work, slate roofs are repaired. A complete furnace cleaning service is maintained for which there are 3 portable cleaning machines and a new giant cleaner. Four men are employed in the service department. A large number of conversions of coal furnaces to gas and oil are made.

The general office, engineer's office and Mr. Montefusco's private office are all fitted with modern equipment. The entire building will be air conditioned this year. The general office is in charge of a young lady bookkeeper and office girl. An engineer is employed in the heating division.

Several methods help to secure business. Newspaper advertisements are run frequently as many as two a week during the summer season. These for the most part are two-column 8 in. ads. They promote the sale of furnaces and furnace cleaning service.

Last year a 15 minute radio program was sponsored, which consisted of music interspersed with three or four spot announcements. Since Jan. 1 only spot announcements have been scheduled, one each day, six days a week.

Direct Mail Cards

Direct mail is used occasionally, when furnace folders are sent out. With the purchase of the big furnace cleaner this year, 3,000 double post cards were mailed advertising this service. One of the detachable cards advertises the service, while the other is a postage-paid return card for those who desire service. Mailings are made to persons in the small towns in the Peoria area and considerable business comes from this outlying territory.

A company custom that is simple but creates much goodwill with customers is taking a snapshot of new installations, including furnaces and conversions, and mailing a copy to the customer as a little surprise.

"Although our other methods of promotion help us to secure many new prospects," says Mr. Montefusco, "there is nothing else so effective as personal contacts. For that reason, we employ a sales manager and another salesman. The sales manager is in direct charge of all new sales and has his own office. He gets many prospects from our promotional work and from our service department. The servicemen enter many houses for repair and cleaning of furnaces and therefore find out about furnaces needing replacement.

"However, the sales department does not depend upon these prospects but also hunts for prospects. The sales manager employs five or six canvassers who work on a salary and commission basis. These canvassers make door-to-door calls for cleaning jobs and offer free inspection of furnaces. The salesmen follow up on the reports made by canvassers. These door-to-door calls are our most effective promotional method.

"Of course, the character of our work has much to do with our success. We guarantee every job and every piece of merchandise we sell. Because we are just as prompt in attending to any complaints as we are in trying to secure business, we have built a good reputation. We believe that a good reputation is half the battle in selling. Our slogan is that every customer must be satisfied. The word-of-mouth advertising we get from our customers is probably as great an asset to us as any of our formal methods of promotion."

Mr. Montefusco is not only active in promoting his own business, but he works for the interest of the entire trade as well. He is a member of the Peoria Sheet Metal Contractors' Association and takes an active part in its programs.

New England Gas Approved

THE FEDERAL POWER COMMISSION has issued an opinion and order authorizing Northeastern Gas Transmission Co. of Boston, Mass., to supply part of the New England area with natural gas. The FPC stated it was of the opinion that the balance of the markets should be served by Algonquin Gas Transmission Co., also of Boston, upon a showing that it has an adequate supply of gas.

The commission at the same time authorized Tennessee Gas Transmission Co., of Houston, Tex., to carry out a $118,643,545 expansion program. Tennessee is the parent of Northeastern, and the newly-approved facilities will be used in part to supply a portion of the natural gas requirements of the subsidiary.

Basic Types of Welding Operations

RICK MANSELL

An analysis of the various types of fusion welding processes. History and development of the processes is given as well as applications in industrial production. Photos are from Air Reduction Sales Co.

THE field of welding operations has been separated into three main categories; non-pressure processes, pressure processes, and brazing processes.

The first category of non-pressure processes includes gas-welding, arc-welding and thermit welding. By long established practice, the term fusion welding has been employed to describe these non-pressure operations. It is recognized that some of the other welding processes also involve a fusion effect.

Fusion welding has been described as a group of processes in which metals are brought to the molten state at the surfaces to be joined, and welded without the application of mechanical pressure. Filler metal may or may not be used in the operation. As a general rule, the welding rod and the base metals being joined, have essentially the same composition.

Classified under the heading of pressure processes are: forge welding, pressure thermit welding and resistance welding. In recent years, cold welding has been included in this category. It involves the application of pressure without heat.

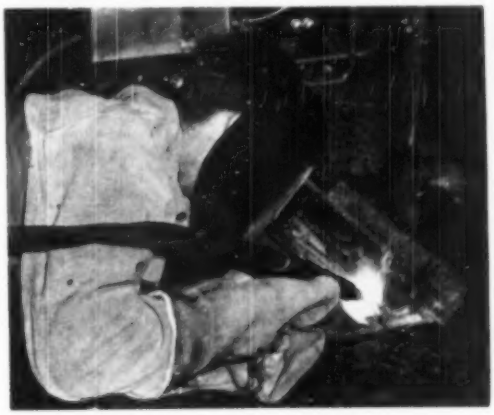
Joining Characteristics

In fusion and pressure welding operations, the joint is effected by means of a softening of the parent metals followed by an actual cohering with the filler metal. They are therefore distinguished from the third main category — the brazing processes, in which this cohesion does not occur. Because of the nature of the joint, this third classification has been referred to as the adhesion processes. Soft soldering, silver (hard) soldering, and bronze welding are included in this group.

In the presentation of the types of welding operations encountered in industrial fabrication, fusion welding processes occupy the most important place. In fact, when the term welding is employed, the mind automatically thinks of either gas or arc welding.

In gas welding, two pieces of metal are brought together and the edges in contact are quickly melted with the flame. Under the intense heat of about 6000 F the molten metal flows together until each edge is completely fused with the other and also with metal supplied from a welding rod. The metal becomes a solid piece in one rapid, economical operation. Gas welding includes air-acetylene, oxy-gas, and oxy-acetylene operations. The latter may involve an oxidizing flame, a neutral flame, or a reducing flame.

Arc welding depends upon the fact that when an electric arc is formed between two pieces of metal, they become very hot and fuse together when brought into close contact to form a homogenous mass. Arc welding may require an alternating current as in the atomic hydrogen process, a direct current as in the carbon arc, or both as in a metal arc. The atomic hydrogen process is shielded, while the metal and the carbon arc may be either shielded or unshielded.



This gun can weld 30 in. a minute.

The electric current passes between two terminals through a gaseous medium and is accompanied by intense heat and vivid flame. High temperatures result and the heat is localized in a small area. The arc is formed when two conductors of an electrical circuit are brought together and then separated while there is sufficient voltage to maintain the flow of current through the intervening gaseous medium. As the arc lengthens the voltage rises and there is a corresponding rise in temperature. Hence a short arc is called a cold arc and a long arc is a hot arc.

A prefabricated fireplace is being welded with an oxy-acetylene torch and a mild steel filler rod. A typical application for this welding process.

Origins

The electric arc in welding has been known to the scientific world since 1837. In that year, a patent involving the use of the carbon arc was granted to M. Bernados. Two years later in 1839, a patent for the metallic arc process was given to Mr. Coffin. Progress was slow during the next 30 years until it began to be adopted by industry.

While arc welding as a process is older than gas welding, its original development was retarded because of the unavailability of the proper types of electrodes. Fifteen years ago, few people were using coated electrodes. Today, they are more or less universal. They have displaced the bare electrode to a large extent.

The evolution of gas welding had its origin about the year 1833 when Fletcher discovered that an autogenous weld could be made by heating two pieces of metal to their melting point and bringing them into close contact while the edges were still molten. He did not develop the process commercially because he was unable to obtain pure oxygen, and the coal gas which he used did not provide sufficiently high temperatures.

The basic experiments which led to development of the oxy-acetylene process resulted from the discovery by Le Chatelier, in 1895, that combustion of acetylene with oxygen produced a flame having a far higher temperature than that obtained when the natural gases were burned. When oxygen and acetylene are burned together they produce temperatures as high as 6300 F.

To become commercially successful, it was necessary that both oxygen and acetylene be made available in sufficient quantities. In 1892, a method for the commercial production of calcium carbide, the substance from which acetylene gas is produced, was discovered at Spray, N.C. In 1901, the Union Carbide company began to manufacture acetylene generators. Compressed acetylene was dangerous to handle and then the Prestolite company introduced the idea of dissolving acetylene gas in acetone.

The first commercial oxygen was produced chemically by a process that was merely an adaptation on a larger scale of familiar laboratory experiments. Gradually, the idea developed of compressing oxygen into steel cylinders. These provided a convenient means of transporting a supply of oxygen to any desired location. In 1895, a machine for the production of liquid air was placed in operation. The commercial production of oxygen from

this liquid air was begun by Dr. Carl von Linde. This was the forerunner of the present process for the manufacture of commercial oxygen.

Oxygen and acetylene are mixed in correct proportions in a blow-pipe or torch. A flame is produced with a temperature far above the melting point of all commercial metals. It therefore provides a means for a controlled rapid and localized melting of metal. The character of the flame can be controlled so that it does not have an injurious effect on the metals.

Steel was the first metal with which the techniques of the oxy-acetylene welding were developed. It was found that in order to obtain a thorough fusion to the bottom of the weld, it was necessary to bevel the edges of all except very thin materials. This led to the use of added metal to compensate for this, in the form of a welding rod. The metal of the welding rod is thoroughly fused with the metal from the two parts being joined, in order to fill up the vee formed by the beveled edges.

Early Uses

Experience gained with steel was extended to other metals. In some cases it was found that the use of flux was necessary to insure sound weld metal. As new alloys are introduced, they are not considered acceptable by industry until their welding properties are investigated. The correct procedures for the welding of these alloys have been standardized from research conducted in metallurgical laboratories.

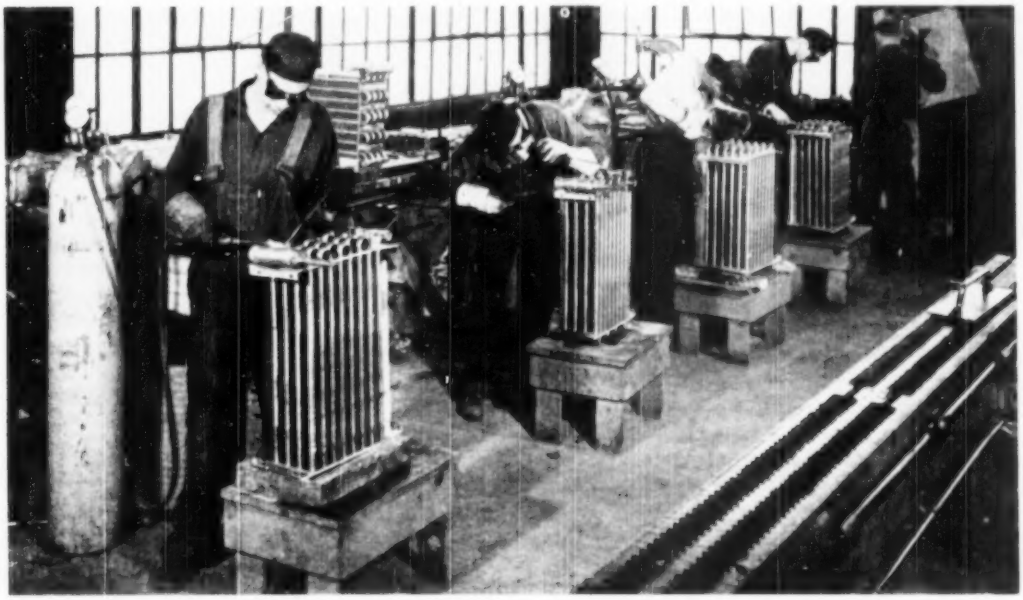
In its first stages, welding was mainly used as a valuable repair process. Then it expanded into the field of production. Before the process was ten years old fabrication of welded articles from sheet, plate and pipe, had progressed to a considerable degree. Cast iron, wrought iron, plain carbon steel, cast steel, alloy steel, stainless steel, copper, brass, bronze, aluminum, aluminum alloys, nickel, nickel alloys, magnesium alloys and lead, are all joined by the oxy-acetylene fusion welding process.

The term fusion weld is used because the base metal is actually melted and fused together, along with metal from the welding rod. The base metal and the welding rod generally have essentially the same composition. There are certain variations of the fusion welding technique that increase the speed of welding and improve efficiency.

Steel welding has found wide application in pipe welding, both for overland line construction and for building and industrial piping. Certain problems encountered in the fabrication of airplane fittings from chromium-molybdenum tubing have also been solved by a modification of this technique.

Bronze-welding is a method for producing strong joints in metals having a melting point higher than that of the bronze welding rod used. The base metal is not fused with the weld metal. A joint is produced through the formation of a strong bond between the bronze metal and the base metal. This process is not a fusion welding method.

This survey deals particularly with the true fusion welding methods. It is noted that there are two main ways of generating the necessary heat to bring the metals to their melting point. With a torch, this is done with the flame produced by the combustion of gases. With



Production set-up for brazing evaporator return bends and connections. An oxy-acetylene torch is used for heating in this job.

electricity, it is due to the arc caused by resistance to the current jumping the gap between metal and electrode. Either method produces a temperature of about 6000 F and this is considerably above the melting points of commonly used metals.

Use of Electrodes

In arc welding some form of electric generator or converter is used and these vary in type and operation. When a carbon electrode is used to produce the arc, filler rods are employed as with gas welding. Resemblance in the puddling of the metal is noticeable in both methods. When a bare metallic electrode is used, it also functions as a welding rod, as it melts into the base metal through the arc stream to fill the groove or seam.

The heat of the arc melts the work metal and at the same time the electrode melts and is carried across the arc. Estimated temperatures range from 4500 F to 7000 F. (With carbon electrodes a higher temperature of between 7000 F and 9000 F is generated). Bare electrodes are constructed of pieces of mild steel wire 14 in. long and with diameters varying from 3/32 to 1/4 in. Occasionally, there is lime on the surface due to the drawing process used in their manufacture.

In some cases, the bare electrodes are subcoated and this is done by slightly rustling the wire during hot drawing. Sometimes rods are lightly coated with some sort of protective material. This improves arc stability and creates a better current-carrying atmosphere in the proximity of the arc. But as a general rule, bare electrodes tend to produce brittle welds subject to corrosion because of the action of atmospheric gases. There is a nitriding effect as well as oxidation which leads to contamination of the weld with oxides which result in low strength.

Shielded electrodes are made to improve the strength and ductility of deposited weld metal. A heavy coating on the electrode protects the molten filler metal as it passes across the arc from the damaging effects of atmospheric oxygen and nitrogen. It also controls arc stability. A greater heat is provided by the shielded metallic arc as compared with the bare metallic arc and this melts the electrode faster. There is a greater fluidity of metal and an increased welding speed.

There are a number of different processes which are included in the field of arc welding. The dc carbon arc process is used for carbon steels, copper and copper alloys, stainless steels, and aluminum. The work is made the positive pole of the arc and the carbon electrode, the negative pole. The dc metal arc is commonly used and most metals and alloys can be welded by this process if the welding rod, current and polarity are all properly chosen.

The ac metal arc permits higher currents than possible with dc arcs thus allowing thicker materials to be welded. This process is not suitable for welding with aluminum, copper alloy, nickel alloy or bare steel rods. The hidden arc process uses a bare metal rod and granulated flux. The arc end of the rod is covered by the flux during welding. Stainless and clad steels, copper-silicon and nickel alloys as well as heat-resistant alloys can be welded by this method.

The inert-gas shielded arc process is used for metals difficult to weld by other processes; stainless steels, aluminum, magnesium, Hastelloys, nickel alloys, copper alloys, hard-facing alloys, and silver. The atomic hydrogen arc is used for specialized applications; high-speed, high-nickel and high-chromium alloys and light gauge sheets, as well as for welding stainless steel tubing.

In the field of gas welding, there are two other processes, in addition to the oxy-acetylene. This latter method is used for welding steels and many non-ferrous alloys (aluminum sheets over 3/16 in. in thickness are welded by this process.) The oxy-hydrogen method is used for welding low melting point materials such as aluminum, lead and magnesium (especially for welding aluminum sheets 1/32- 3/16 in. thick). The pressure welding method is a relatively new process for joining steel pipe, tubing, rails and sheet.

While the gas methods of welding were started industrially earlier than the electric arc, both processes have been adapted for many lines of fabrication. Each method has its own advocates and its optimum application usage. From a metallurgical viewpoint there is not much significant difference between a fusion weld made with a gas torch and one obtained from an electric arc.

The fundamentals are similar, hence a master welder is able to use both the torch and the arc. The skill developed in working with one process can be transferred fairly quickly in mastering the technique of the other. Striking the arc does require a little more practice and skill than adjustment of the torch flame. The positioning of the arc depends upon the operator's skill and not upon a mechanical adjustment.

The electric arc provides more heat than the oxy-acetylene flame. Reason for this is that the arc is produced directly between work and electrode, there is less heat loss and the result is greater welding speed. Gas welding equipment is less expensive and more adaptable to the wide variety of metals with which the welder is confronted. The initial cost of heavy duty dc generator type machines is rather high, but the introduction of ac transformer type electric arc welding units has resulted in a lower initial cost. In general, arc welding can produce a quicker weld at less cost.

Gas welding is widely used in the welding of light gauge metals and sections. The electric arc method is more generally employed in welding plates and thicker sections, as in shipbuilding. Overland oil piping is welded by both methods — the pipe in the smaller sizes is usually gas welded.

In order to complete this survey of fusion welding processes, a brief summary is given of thermit welding. This method is used for joining the steel rails of a railway track. Finely divided aluminum is mixed with iron

(Please turn to page 136)

ANOTHER LASTING ROOF OF REVERE COPPER

View from steeple of batten seam copper roof on St. Augustine's Church, Spokane, Washington. John W. Maloney, Architect, Seattle; Walter G. Meyers & Son, General Contractor; Krueger Sheet Metal Company, Fabricator; Eagle Metals Company, Revere Distributor—all of Spokane.

● Dollar for dollar, whenever you want lasting sheet metal construction, *there is no substitute for copper.* Because copper—beyond any other material commonly used for roofing, gutters and flashing—has proved its ability to give longer service per dollar of cost when properly designed and installed.

These statements are backed by facts and figures developed by intensive research and by case histories of well-known buildings. No other sheet metal construction material can support so strong a claim.

To make certain of correct design and take advantage of proved installation techniques, it will pay you to use the new design and installation data developed by the Revere Research Laboratories. You'll find these data in Revere's book, "Copper and Common Sense", an authoritative manual of sheet copper construction that has been widely distributed to architects and sheet metal contractors. There is probably a copy in your files. Be sure to refer to it as your guide to finer and more durable sheet copper construction.

Revere sheet and roll copper and other Revere quality materials are available from leading distributors throughout the United States. A Revere Technical Advisor will always be glad to consult with you without obligation.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

Use these Guides

FOR BETTER WARM AIR HEATING INSTALLATIONS

● Many thousands of warm air heating men throughout the country have found these manuals and worksheets one of their best sources for correct design and installation information. F.H.A. and other federal, state, and local officials have accepted them as authoritative guides.

By following the recommendations presented in these manuals, you, too, can assure your customers the best possible warm air heating systems. These manuals outline step-by-step procedures to be followed on the job. Written in an easily understood manner, they contain complete "know-how" information and precalculated tables for designing and installing warm air heating equipment.

Check the titles of these manuals and worksheets and see the range of their practical aid. If you don't have the latest editions . . . . . .

ORDER FROM

MANUALS . . . 60 cents each

1. How to make a comfort survey—*1950 Ed.*
2. How to check frame house construction—*1950 Ed.*
3. How to figure heat losses—*1950 Ed.*
4. Warm air perimeter heating—*1950 Ed.*
5. Code and manual for gravity systems—*1950 Ed.*
6. Service manual for continuous air circulation technicians—*1947 Ed.*
7. Code and manual for winter air-conditioning systems—*1950 Ed.*
7A. Code and manual for ceiling panel systems—*1950 Ed.*
8. A yardstick for classifying warm air winter air conditioning systems—*1948 Ed.*
9. Code and manual for winter air conditioning systems over 120,000 BTU—*1950 Ed.*

WORK SHEETS

Form 1	Information blank	$12.00 per 100
Form 2	Heat loss and work-sheet	$6.00 per 100
Form 3	Gravity short form	$6.00 per 100
Form 4	Winter A.C. short form	$6.00 per 100
Form 5	Warm air perimeter system	$6.00 per 100
Form 9A	Heat loss sheet (manual 9)	$6.00 per 100
Form 9B	Branch and stack sizing (manual 9)	$6.00 per 100
Form 9C	Trunk duct sizing (manual 9)	$6.00 per 100

Warm air heating contract blanks $1.50 for 50—$2.50 for 100

NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION

145 Public Square • Cleveland 14, Ohio

Kalamazoo

THE KALAMAZOO SHEET METAL, Roofing, Heating And Air Conditioning Contractors' Association meeting was held Wednesday evening November 8, 1950, with annual election of officers taking place. New officers elected are as follows:

President ..... Glen Rynbrand
Vice President ..... Lewis Andrus
Treasurer ..... John DeHaan
Secretary ..... Myron A. Rice

Arkansas

J. E. HARNBROOK, Little Rock, has been named president of the Arkansas Sheet Metal Contractors Association, recently organized.

Objectives of the group will be to improve standards of sheet metal work as applied to heating, ventilating, and air conditioning systems and to facilitate cooperation with other branches of the building industry.

Other officers are: Travis Dodson, Magnolia, vice president and H. H. Ketcher, Sr., Little Rock, secretary-treasurer.

Canadian Chapter

C. B. TAYLOR, managing director of the Canadian Chapter, National Warm Air Heating and Air Conditioning Association, has announced that Thomas A. Clark will assume the duties performed for the last four years by J. W. Taylor, Chapter engineer.

Following the study of engineering at Queen's University in 1936, Mr. Clark's early experience was with the Simpson Plumbing & Heating Co. in Sudbury, including plumbing, steamfitting and warm air heating—both installation and service. In the late 30's he and

Coming Events — 1951

Jan. 11-13—Sheet Metal & Roofing Contractors Association of Minnesota, Annual Convention, Lowry Hotel, St. Paul. Ray J. Kraus, Secretary, 508 S. 7th St., Minneapolis, Minn.

Jan. 21-25—National Association of Home Builders, 7th Annual Convention and Exposition, Stevens and Congress Hotels, Chicago, Ill. E. M. Spiegel, Convention Chairman, Passaic, N. J.

Jan. 22-25—American Society of Heating and Ventilating Engineers, Annual Meeting, Belden Stratford Hotel, Philadelphia, Penn. A. V. Hutchinson, Secretary, 51 Madison Ave., New York, N. Y.

Jan. 22-26—10th International Heating, Ventilating and Air Conditioning Exposition, under auspices of American Society of Heating and Ventilating Engineers. Commercial Museum, Philadelphia. International Exposition Co., Grand Central Palace, New York City.

February 1-2—Sheet Metal and Warm Air Heating Contractors Association of Indiana, Inc., 33rd Annual Convention, Hotel Severin, Indianapolis. Frank E. Anderson, Secretary, 439 S. 17th St., Terre Haute, Ind.

Feb. 12-14—Sheet Metal Contractors' Association of Wisconsin, Inc., 36th Annual Convention, Schroeder Hotel, Milwaukee, Wis., Irving F. Kanitz, Executive Secretary, 225 E. Michigan St., Milwaukee.

March 5-6—Ohio Sheet Metal Contractors' Association, Annual Convention, Columbus, Ohio. Wm. C. Lumm, Secretary, 2512 Albion St., Toledo, Ohio.

March 11-14—New York State Sheet Metal, Roofing, and Air Conditioning Contractors Association, Annual Convention, Hotel Utica, Clarence Meyer, Secretary, 567 Genesee St., Buffalo, N. Y.

March 30-31—Sheet Metal, Air Conditioning and Roofing Contractors' Association of Pennsylvania, Annual Convention, Lancaster, Penn. Charles Luppold, Convention Chairman, Reading, Penn.

April 2-4—Sheet Metal Contractors Association of Illinois, Inc., Annual Convention, Jefferson Hotel, Peoria, Ill. W. R. Shaw, Secretary, 695 E. State St., Jacksonville, Ill.

April 10-12—Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association, 40th Annual Convention, Pantlind Hotel, Grand Rapids, Mich. N. J. Biddle, Secretary, 3055 E. Grand Boulevard, Detroit, Mich.

Edward Lefebvre joined forces and organized a sheet metal business in Sudbury.

During the war years he was for a time with the Dept. of Munitions & Supply and under the direction of the Bureau of Technical Personnel became identified with Canadian Car & Foundry in Fort William, designing jigs and fixtures for aircraft fabrication.

In 1945 Tom Clark joined the staff of Northern Engineering & Supply Co. in Fort William and there he obtained experience in a wide variety of warm air heating design and installation, ranking from the small gravity installation to large forced air systems for schools, churches and institutions.

Mr. Clark comes to the Chapter, therefore, with a wealth of practical experience. Each year has seen him in attendance at a Chapter school and he has also assisted F. W. Taylor as an instructor.

NAHB

When the 7th Annual Convention and Exposition of the National Association of Home Builders opens in Chicago, January 21, there will be a record number in attendance. That prediction was made by Paul S. Van Auken, convention-exposition director, who has in the past exhibited an ability to estimate final attendance figures from a study of advance registrations and his contacts with local association secretaries.

Dates of the conclave were advanced from February to January this year. The fact that all available exhibit space in both the Congress and Stevens hotels was sold out in mid-October, plus a heavy advance registration, indicates almost unanimous approval of the earlier dates among exhibitors, builders and allied interests.

A program of outstanding interest is in store for those in attendance. With new government regulations and restrictions tumbling out of Washington, the convention program will be focused on the crucial question of how home builders can cope with present conditions.

Los Angeles

The Institute of Gas Heating Industries held its regular monthly meeting on Thursday, Nov. 9, 1950, in Los Angeles. There were 67 members and guests present. President Bridges presided and ordered approval of the minutes as published.

President Bridges reported the action taken by the board in their selection of a new managing director, and after a few pertinent remarks introduced R. E. Harkens.

The chair commented on the excellence of the Gas Heating Engineering and Sales Training course last year, and announced this year's committee. In confirming the appointment and acceptance by these men Reg Hesling (Sugden Engineering Co.) was identified as chairman; Ed Sales (Benedict & Benedict) as co-chairman. Committeemen: Tom Pinatelli, Mickey O'Haver, George Ashburn, Ralph Taylor, Walter Dicus, Gordon Payne.

Mr. Bridges announced the appointment of Walter Dicus, chairman, and Glenn Ashburn and Lou Hull as nominating committee for the coming election of officers.

PROGRAM COMMITTEE: Sam Jaffe took the chair and introduced the speakers, identifying each as to his business and background and qualifications to discuss the subject What I Look For In Heating When I Design Or Build A Home.

NEAL DEASY, A. I. A., from the standpoint of the architect: Many of you have watched a building going up. The nude structure is the most exciting part of the entire construction. The modern home as it goes up is a thing of beauty but in the home today the bare structure doesn't seem to provide for heating ducts. This is the problem I would like to discuss.

I have been tempted, on occasion, to use a suspended system in the home. However, a small home won't accommodate this type because of noise and force resulting from its use.

In answering the question posed above I think I can give you something to shoot at. I would like to have a furnace with a capacity up to 150,000 Btus about the size of a small suitcase. Heating ducts about the size of ½ in. electrical conduit. Registers about the size of a convenience outlet. Then I think I would have what I look for in heating and I think it's an idea worth working on.

VERN R. HUCK, general building contractor; Past President of the Building Contractors Assn. of California, from the standpoint of the custom builder:

As a building contractor I must remember that we are subject to the printed specification. However, from the standpoint of the custom builder I think we are ultimately looking for a satisfied customer. In addition to this I think I look for a forced air piece of equipment to not only heat the air but to change it as well. In radiant heating I have to ask "How does the air in the room change?" Air change is tremendously important. In answering the question, the subject of the evening's panel, I think I would have to answer in two parts: one, is when we get into smaller homes where the home is limited to dollars and cents — in this type of home we have to get into floor and wall furnaces. In finer homes the owners seem to be looking for radiant heating with some type of circulating system to remove dust and maintain a given temperature.

WALTER HAGEDOHM, A. I. A., from the standpoint of the architect:

I can remember the time when the heating industry was instructing the builder on the how and the why of heating in the small home. In this interest I think there is always room for associations for the upgrading of home building of which the Institute of Gas Heating Industries is a part.

In heating systems for a home I want a heating system that works. What I mean is a system that meets economic tests of dollars and cents invested and the continuing use of the system itself.

EQUIPMENT DEVELOPMENTS

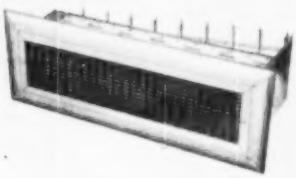
Power Exhauster 210

New power exhauster incorporates latest design features, including modern low silhouette. Maximum height for largest unit is only 36½ in. Air expulsion is downward onto roof through weather-proof outlet. Where upward discharge is desired, unit can be supplied without mushroom cover.

Unit is shipped as a complete package ready for field installation.

Fan embodies latest developments in air foil design. Blades are high tensile strength aluminum alloy, balanced and designed so that they can be replaced in the field without purchase of an entire new wheel. These blades are also vinylite coated for resistance to acid and alkali fumes.

Gallaher Co., Omaha 3, Nebr.



Grille & Volume Control . 211

For reduced sheet metal erection and fabrication costs, duct take offs can be eliminated with a combined grille, volume control, and deflecting vane. Installation costs are also reduced by installation of three units in a single operation. Engineered air deflecting vanes produce uniform flow across the grille face and minimize duct turbulence and turning losses. For ease in system balance, volume control adjuster is accessible from the grille face yet hidden and tamper-proof. Supply air distribution can be conveniently adjusted vertically or horizontally after installation. Diffusings lugs on the grille fins promote thorough mixing of room and supply air for elimination of drafts and rapid temperature equalization.

Barber-Colman Co., Rockford, Ill.

(Use Coupon on this Page)

Portable Winch Hoist . . 212

Built for rigorous requirements a new 1½ ton winch-hoist offers many new and useful features. With a 30 to 1 power ratio and fully tested to a 300 per cent overload, weight of the hoist is held to only 23½ lbs. Standard features include top grade preformed flexible cable, stainless steel fittings and springs, and oiled-for-life bearings. Unique combination of three swivel hooks and built-in pulley block allows work to be done around corners and as close as 10 inches at the ¾ ton rating. Locking is positive and automatic; no brake to slip; can be operated in any position; and may be set for forward, reverse, or free wheeling.

The Lug All Co., Wynnewood, Pa.

Low Temperature Flux . . 213

AG Flux increases the bond of silver solder on stainless steel, Monel, nickel, copper, brass, bronze, and steel. A low temperature flux with a powerful scavenging action that acts on the silver solder to eliminate the time lag between fluidity of the solder and its adherence to the parent metal.

Actually breaks the oxide on copper aluminum alloys, a new metal not widely used due to difficulty of soldering. The flux actually disburses the aluminum oxide leaving the silver solder uncontaminated with residual oxide. Flux residue may be removed by washing with hot water.

May be thinned with water without reducing its effectiveness.

Farrellloy Co., Philadelphia 21, Pa.

MAIL THIS NOW!

We will ask the manufacturer to send full particulars about the products and literature mentioned.

Be sure to circle the items you want. 12-50

Equipment Developments

210 211 212 213 214 215 216 217 218
219 220 221 222 223

New Literature

377 378 379 380 381 382 383 384 385
386 387 388 389 390

Manufacturer ☐ Jobber ☐ Dealer ☐

Name

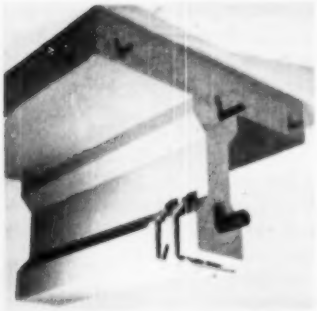
Company

Address

Address: AMERICAN ARTISAN, 6 North Michigan Ave., Chicago 2, Illinois

EQUIPMENT DEVELOPMENTS

(Use Coupon on Page 105)



Clamp Hanger 214

Clamp hangers are designed to support ductwork hung on precast concrete joists. Tolerate normal variations in joist widths as the clamping action will support the load satisfactorily on normally undersize or oversize joists. Unit consists of a simple, two-piece hanger that can be assembled and installed on a standard precast concrete joist in a few seconds. Though no special tools are needed for installation, the hanger is sturdy beyond the requirements of all common needs and grips the joist more firmly with every added pound of load. No load is needed to hold the hanger in place after it is installed, thus permitting all hangers to be mounted before any ducts are attached. V-shaped lugs are incorporated in the horizontal legs of both the tongue and the fork tines to minimize tilting of the hanger when it is loaded eccentrically.

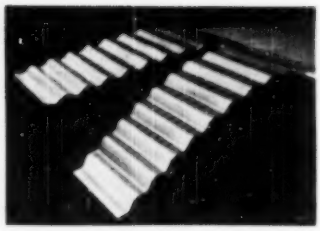
United Industries, Madison 1, Wis.

Aluminum Roofing 215

A new type of aluminum roofing is cross crimped with small corrugations before forming to increase its strength and rigidity. Sun glare is broken by the new pattern of crimping, which also eliminates visible seams and overlapping.

New roofing keeps buildings as much as 20 per cent cooler in summer.

Available in 26 ga and 24 ga.



$1\frac{1}{4}$ in. or $2\frac{1}{2}$ in. corrugated and 5V crimp.

New Holland Metals Co., Mountville, Pa.

Service Utility Truck . . . 216

New service utility trucks specially designed for use in electrical and appliance service and repair work feature Aristocrat troubleshooter bodies designed for L-110, L-120, L-130, or L-150 International Harvester chassis. The bodies are factory mounted.

Weathertight vertical and horizontal compartments on left and right sides, recessed door handles, slam-action catches, and cylinder locks which are keyed alike are features of the body. Parts bins are provided in horizontal compartments on either side of the body. Bins on the left side have removable

dividers. Tool and material trays are built-in, and all compartment shelves and partitions have safety rolled edges.

Motor Truck Div., International Harvester Co., Chicago, Ill.

Portable Electric Arc Welder 217

New portable electric arc welder, Model 125A, is compact in design and completely portable for on the spot welding. Model 125A welds light as well as heavy gauge metals and is designed for all types of installation, construction, and maintenance work.

Engineering features include improved method of cooling, spun glass insulated transformer, and fully insulated terminals.

Model 125A has 16 heat stages ranging from 20 to 125 amps. It handles from 1/16 in. to 5/32 in. welding rod and welds iron, steel, brass, bronze, and other metals in a wide range of gauges.

All welders are furnished completely equipped including head shield, electrode holder, ground clamp, cables, and a supply of assorted welding rods.

Trindl Products, Ltd., Chicago, Ill.

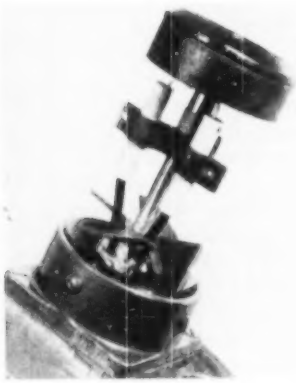
Manual Motor Starter . . 218

Improved manual starter equipped with an indicating light shows when a motor is running. Especially useful for starting and protecting small ac and dc motors used with fans, pumps, compressors, and other industrial or domestic appliances. Available as double pole switch with ratings up to 1 hp. 250 v.

Positive bimetallic overload protection allows safe capacity overloads but automatically disconnects the motor on any sustained or damaging overload. Proper selection of the replaceable heater allows sufficient time delay for small motor starting.

Straight through wiring and accessible front terminals allow easy installation and service.

Westinghouse Elec. Corp., Pittsburgh, Pa.



Adjustable Turbulator . . 219

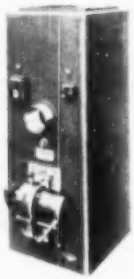
A basically new adjustable turbulator is designed to produce the highest possible oil burner combustion efficiency, thereby using the minimum amount of fuel. It is possible to adjust turbulence to suit individual conditions. For example, either right hand or left hand rotation of the flame is possible. Once set, the turbulator can be locked in position so positive individualized combustion is maintained.

Approved by Underwriters Laboratories.

Quiet Automatic Burner Corp., Newark, N.J.

Winter Air Conditioner . 220

The 503 oil fired Counterflow employs the principle of having warm air flow from the bottom of the furnace in contrast to the conventional type unit. Unit is specifically designed for the new system of heating houses built on concrete slab on the ground floors, known as perimeter heating.



Factory assembled for ease in handling and installation, front flue eliminates need for wide clearance around sides and rear.

Rated at 82,500 Btuh output, at input of .75 gph.

Thatcher Furnace Co., Garwood, N.J.

Furnace Cleaner 221

A suction furnace cleaner is equipped for wet pick up through the use of a water tight, rust resistant metal container. Unit can be used in cleaning and servicing heating plants of all kinds where there is frequent requirement for some means of quickly removing moisture or scrub water from the plant or the floor around the plant. Also provides for quick and complete removal of residue left in basements by flood waters or sewers.

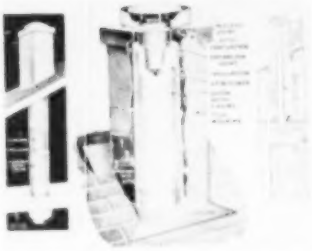
National Super Service Co., Inc. Toledo, Ohio

Chimney Rain Cap 222

A new improved type rain cap and housing top is now being used on the prefabricated Vitroliner type E chimney.

The rain cap with a baffle ring is welded to the housing top forming one unit. This acts as a wind baffle and prevents rain from entering the flue in any manner. New top lends itself to all types of architectural home designs.

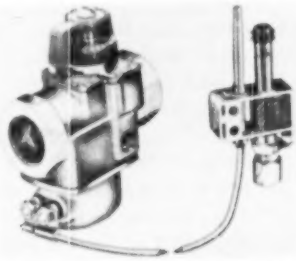
Vitroliner chimney is built around



a vitreous enameled metal flue liner. The liner is encased in a seamless tube of high temperature resistant asbestos insulation. A round aluminum pipe forms the external cover. A flue support at the ceiling is anchored by means of four metal straps nailed to the joists. The roof housing is nailed to the roof and holds the flue and top in proper position.

Chimney weighs only 10 to 15 lbs per ft and is designed to fit the individual pitch of the house. Also has a tailor made roof flashing and flue housing.

Condensation Engineering Corp., Chicago, Ill.



Pilot Burner & Gas Valve . 223

New 260 series pilot burner incorporates a removable filter screen that assists in eliminating lint plugging. Special mounting bracket, designed for various types of appliance installation, holds both the burner and thermocouple in secure operating relation to each other.

New ¾ in. MR-5 gas cock safety valve includes 100 per cent safety shut-off feature, in the event of pilot flame failure. The plastic, manual reset handle may be removed to expose a rod fitting device for use with floor furnace installations.

General Controls Co., Glendale, Calif.

Editorial Index for 1950

Accent on Sheet Metal Work, Harry L. Spooner ..... Sep. 112
Accounting, Complete Records Support Tax Deductions ..... Oct. 59
Controlling Overhead Expense Strengthens Business Operation ..... Nov. 65
Cost Control Guards Profit ..... Jan. 108
Five Phases of Business Management for *Indoor Comfort* Dealers ..... Mar. 70
Semi-Fixed Assets Can Be Dangerous ..... Apr. 70
Set Prices High Enough to Recover Overhead or Profits will Vanish ..... Jul. 71
Simplified Bookkeeping System Solves Problems for Detroit Contractor ..... Dec. 56
Accounting — Language of Business, Betty Lee Gough ..... Dec. 58
Adjustment for Continuous Air Circulation Using Duct Thermometers ..... Sep. 96
Advertising, Boost Sales with Direct-Mail ..... Aug. 68
Combine Advertising with News for Readership ..... May 71
Customers' Signs Help Your Business ..... Sep. 80
Newspaper Advertising — Key to Success ..... Jun. 66
Radio Advertising Can Fit Into *Indoor Comfort* Promotion ..... Feb. 62
Television — Great Potential Medium for Heating and Sheet Metal Field ..... Sep. 76
Tin Horse Keeps Sheet Metal Shop in the Public Eye ..... Nov. 60
AGA, API-AGA Fuel Reserve Report ..... Apr. 83
Air Distribution, Selection of Diffuser Lighting Units for Air Conditioning ..... Nov. 74
Air Washers Cool Type-Setting Plant, Joseph V. Mariner ..... Jun. 84
Alberty, Bryce E., (see Temperature and Heat Loss Characteristics of Concrete Floors)
All-American House of 1950 Favors Warm Air Heating System ..... Feb. 71
Allen, Ralph, Time Modulation Control Increases Comfort, Part (I) ..... Jul. 83
Part (II) ..... Aug. 82
Aluminum Coated Steel Offers Many Fabrication Advantages, Rick Mansell ..... Mar. 108
Anderson, B., Simplified Bookkeeping System Solves Problems for Detroit Contractor ..... Dec. 56
Anti-Spin Vanes Reduce Wear in Collector, H. M. Nichols ..... Jul. 108
API-AGA Fuel Reserve Report ..... Apr. 83
Architectural Sheet Metal, Copper Sheet Metal Work & Aluminum Coping Specified for New Milwaukee Arena ..... Oct. 81
Arrangements for Defense, Arnold Kruckman ..... Sep. 85
Balancing the Heating System for *Indoor Comfort*, P. K. Wadsworth, Part (I) ..... Sep. 94
Part (II) ..... Oct. 76
Part (III) ..... Nov. 79
Part (IV) ..... Dec. 75
Bareither, Harlan D., (see Temperature and Heat Loss Characteristics of Concrete Floors)
Basic Types of Welding Operations, Rick Mansell ..... Dec. 97
Basing Point Veto, Arnold Kruckman ..... Jul. 75
Batten Roof Features Snap-On Cap, Lloyd H. Overly ..... Nov. 91
Batten Seam Roof of Monel Metal Utilizes New Type of Pan ..... Feb. 104
Blowers, Profit Possibilities in Package Blowers, Part (I) ..... Jan. 130
Part (II) ..... Feb. 81
Boost Sales With Direct-Mail, Arthur Roberts ..... Aug. 68
Brubake, L. T., Copper Sheet Metal Work & Aluminum Coping Specified for New Milwaukee Arena ..... Oct. 81
Electronic Secretary for Night Service Calls ..... Apr. 73
130 Tons of Ductwork ..... Oct. 83
Building a Profitable Mailing List, Ernest W. Fair ..... Nov. 62
Building Design & Floor Plan for Large Metal Fabrication Plant, Ernest E. Zideck ..... Apr. 111
CAC, Adjustment for Continuous Air Circulation Using Duct Thermometers ..... Sep. 96
What's Wrong with CAC? ..... Aug. 86
Casey, Wm. J., Pensions — A Management Problem, Part (I) ..... Jun. 75
Part (II) ..... Jul. 73
Change in Control Planning, Arnold Kruckman ..... Nov. 67
Changes in Social Security Law ..... Oct. 58
Chart Compares Cost of Fuel, W. F. Schaphorst ..... Jan. 166
Chart Gives Correct Insulation Thickness to Prevent Moisture Condensation ..... Aug. 84
Chimney Liner Durability Increased by Plastic Paint & Bonding Process, Glenn O. Harmer ..... May 86

Chimneys, Prefabricated Chimneys Build Profits for Heating Contractors ..... Aug. 79
Cleveland Plan of Sales Promotion Can Increase 1950 Profit Volume, R. V. Main ..... May 67
Code of Trade Practice, SMCNA ..... May 72
Codes, Oil Burning Equipment Installation Standards of the National Board of Fire Underwriters ..... Feb. 91
SMCNA Warm Air Heating Ordinance ..... Jan. 115
Warm Air Heating Code of New Castle, Ind. ..... Feb. 64
Collection Methods that Speed Payments, D. D. Seltz ..... Aug. 70
Color Dynamics in the Sheet Metal Shop, Lawrence E. Gichner ..... Dec. 85
Combine Advertising with News for Readership ..... May 71
Complete Records Support Tax Deductions, Arthur Roberts ..... Oct. 59
Controlling Overhead Expense Strengthens Business Operation, Arthur Roberts ..... Nov. 65
Controls, Time Modulation Control Increases Comfort, Part (I) ..... Jul. 83
Part (II) ..... Aug. 82
Cooling, Air Washers Cool Type-Setting Plant ..... Jun. 84
Evaporative Cooling Units on Roof Provide Summer *Indoor Comfort* ..... Feb. 39
Evaporative Cooling Solves Roller Rink Problem ..... May 91
Fundamentals of Calculating Heating and Cooling Loads, Part (IV) ..... Feb. 84
Panel Convection Cooling System for Homes and Offices ..... Feb. 77
Copper Roof on U. S. Capitol Features Metal Battens, Lawrence Gichner ..... May 95
Copper Sheet Metal Work & Aluminum Coping Specified for New Milwaukee Arena, L. T. Brubaker ..... Oct. 81
Correct Nozzle Vital in Oil Heating, Ralph L. Dennis ..... Apr. 96
Correct Practice in Garage Ventilation, W. Schweisheimer, M.D. ..... Aug. 104
Cost Control Guards Profit, Arthur Roberts ..... Jan. 106
Credit, Collection Methods that Speed Payments ..... Aug. 70
Good Credit Rating Simplifies Purchasing ..... Jul. 63
Curbs on Construction ..... Nov. 57
Curiosity Causes Service Calls Says This Service Man ..... Mar. 90
Customer Speaks His Mind ..... Feb. 66
Customers' Signs Help Your Business, David Markstein ..... Sep. 90

Damages for Contract Delay, Albert W. Gray ..... Dec. 61
Deception of Withholding Tax ..... Sep. 75
Defense Production — 1950 ..... Oct. 54
Dennis, Ralph L., Correct Nozzle Vital in Oil Heating ..... Apr. 96
Depreciation — Important Profit Factor, Arthur Roberts ..... Dec. 65
Design of Ventilating Hoods for Grease Filter Applications, Carl B. Rowe, Part (I) ..... Mar. 108
Part (II) ..... May 105
Diagnosis of Electric Motor Trouble May Save Time and Expense ..... Aug. 88
Die Design for Sheet Metal Forming, Ernest E. Zidek ..... Dec. 90
Direct Fired Heaters Simplify — Cut Costs for Commercial-Industrial Applications, R. F. Sharon ..... Jan. 89
Distant Fields Look Greener, Ernest W. Fair ..... Mar. 78
Distillation Equipment of Acid Resisting Metal, Ernest E. Zidek ..... Oct. 94
Drivers Can Be Salesmen, Robert F. Welch ..... Sep. 83
Dust Collecting, Anti-Spin Vanes Reduce Wear in Collector ..... Jul. 103
Ordinances Prohibiting Dust Exhaust Create Problem for Industry ..... Jul. 104
Dust Collecting in a Monument Plant, R. C. Nason ..... Apr. 103
Dust Collecting Work Benches, Ernest E. Zidek ..... Aug. 100

Edelman, B. P., Evaporative Cooling Units on Roof Provide Summer *Indoor Comfort* ..... Feb. 39
Electric Motors, Diagnosis of Electric Motor Trouble May Save Time and Expense ..... Aug. 88
Electronic Secretary for Night Service Calls, L. T. Brubaker ..... Apr. 73
Electrostatic Air Cleaners Offer Health, Economy ..... Jul. 90
Employment, Selective Hiring Strengthens Organization for Competitive Effort ..... Mar. 73
Evaporative Cooling Solves Roller Rink Problem ..... May 91
Evaporative Cooling Units on Roof Provide Summer *Indoor Comfort*, B. P. Edelman ..... Feb. 39

Fair, Ernest W., Building a Profitable Mailing List ..... Nov. 62
Distant Fields Look Greener ..... Mar. 78
Television — Great Potential Medium for Heating and Sheet Metal Field ..... Sep. 76
Fairless, Benjamin F., Steel and the Future ..... Oct. 87
Fans, Industrial Market for Propeller Fans ..... Sep. 103
Filters, Electrostatic Air Cleaners Offer Health, Economy ..... Jul. 90
Sound Merchandising Ideas Help Sell Electric Air Filters ..... Oct. 71
Five Phases of Business Management for Indoor Comfort Dealers, Arthur Roberts ..... Mar. 70
Fleming, Arthur N., (see Temperature and Heat Loss Characteristics of Concrete Floors)
Flashings, United Nations Secretariat Building Uses Miles of Stainless Steel Flashing ..... Jun. 97
Follansbee, Rogers, and W. L. Thomson, Perimeter Heating New Approach to *Indoor Comfort* ..... Nov. 71
Layouts for Perimeter Heating ..... Dec. 71

Forms, Simplified Job Ticket ..... Apr. 72
Fowler, Van, How to Make Tubing in a Power Press ..... Apr. 109
Fuel, Chart Compares Cost of Fuel ..... Jan. 166
Fume Removal, Distillation Equipment of Acid-Resisting Metal ..... Oct. 94
Fundamentals of Calculating Heating and Cooling Loads, James J. LaSalvia, Part (IV) ..... Feb. 84
Gas Heat for 3 Million More Homes ..... Sep. 99
Germicidal Lamps, Glycol Vapor, Germicidal Lamps Save Monkeys ..... Aug. 87
Gichner, Lawrence E., Copper Roof on U. S. Capitol Features Metal Battens ..... May 95
Color Dynamics in the Sheet Metal Shop ..... Dec. 85
How to Plan a Sheet Metal Shop ..... Nov. 94
Huge Trailers Cut Material Handling Cost Increase Efficiency ..... Mar. 97
Stainless Steel Fabrication, No Special Equipment Needed ..... Jan. 162
Gichner Plans Ideal Shop, Ernest E. Zideck ..... Jun. 106
Glycol Vapor, Germicidal Lamps Save Monkeys, Robert A. Latimer ..... Aug. 87
Good Credit Rating Simplifies Purchasing, A. M. Sullivan ..... Jul. 63
Gough, Betty Lee, How to Reduce Your Income Tax ..... Sep. 81
Accounting — Language of Business ..... Dec. 58
If You Lost Money in 1949 — Get a Tax Refund ..... Jan. 110
Government by Smear, Arnold Kruckman ..... Jun. 77
Gray, Albert W., Salesmen's Promises Must Be Controlled ..... Sep. 73
Damages for Contract Delay ..... Dec. 61
Grease Filters, Design of Ventilating Hoods for Grease Filter Applications, Part (I) ..... Mar. 104
Part (II) ..... May 105
Harmer, Glenn O., Chimney Liner Durability Increased by Plastic Paint & Bonding Process ..... May 86
Heating, All-American House of 1950 Layouts Warm Air Heating System ..... Feb. 71
Balancing the Heating System for *Indoor Comfort*, Part (I) ..... Sep. 94
Part (II) ..... Oct. 76
Part (III) ..... Nov. 79
Part (IV) ..... Dec. 75
Fundamentals of Calculating Heating and Cooling Loads, Part (IV) ..... Feb. 84
High Velocity Piping System Features Low Velocity Discharge ..... Jan. 126
Layouts for Perimeter Heating ..... Dec. 71
Natural Gas and Residential Heating ..... Jun. 91
19 Suspended Heaters Heat 1½ Acre Warehouse ..... Oct. 67
Perimeter Heating New Approach to *Indoor Comfort* ..... Nov. 71
Perimeter Warm Air System Solves Problem of Heating Basementless Houses ..... Sep. 89
Preparation of Heating Plant for Installation of Gas Burner ..... Mar. 91
Suspended Installation in Printing Plant Conserves Valuable Floor Space ..... Jan. 121
Temperature and Heat Loss Characteristics of Concrete Floors, Part (I) ..... Mar. 85
Part (II) ..... Apr. 88
Part (III) ..... May 83
Warm Air Baseboard Heating Supplies Heat at Source of Heat Loss ..... Jun. 81
Warm Air Heating Preference Indicated by New Department of Labor Survey ..... Dec. 81
Warm Air Heats Large Buildings ..... Jan. 133
Warm Air Perimeter Heating Applied to School Buildings ..... May 81
Warm Air Unit Heats Auto Salesrooms and Garages ..... Dec. 78
What's Ahead for House Heating? ..... Jul. 79
Heating Dealer Branches Out — Boosts Volume, Robert A. Latimer ..... Nov. 77
Heating Gymnasium Offers Sheet Metal Problems, Walter Rudolph ..... Feb. 97
Here We Go Again! ..... Jun. 65
High Speed Service Plan Increases Heating Sales Volume, Robert A. Latimer ..... Jun. 86
High Velocity Piping System Features Low Velocity Discharge ..... Jan. 126
History of American Artisan 1864-1884 ..... Feb. 69
Home Demonstration Sells Furnaces, Beth Walker ..... Oct. 56
Honerkamp, F., Selection of Diffuser-Lighting Units for Air Conditioning ..... Nov. 74
Housing for Middle Income Groups, Arnold Kruckman ..... Mar. 81
How to Cut Trucking Costs, David Markstein ..... Apr. 68
How to Make Tubing in a Power Press, Van Fowler ..... Apr. 108
How to Plan a Sheet Metal Shop, Lawrence E. Gichner ..... Nov. 94
How to Reduce Your Income Tax, Betty Lee Gough ..... Sep. 81
Huge Trailers Cut Material Handling Cost — Increase Efficiency, Lawrence E. Gichner ..... Mar. 97
Hulin, Lyle K., Preparation of Heating Plant for Installation of Gas Burner ..... Mar. 91
Human Tensions — Unique Approach to Selling, J. Archer Kiss ..... Jan. 103

If You Lost Money in 1949 — Get a Tax Refund, Betty Lee Gough ..... Jan. 110
Indoor Comfort in *All* Seasons ..... May 65
Industrial Market for Propeller Fans, M. Rocke ..... Sep. 103
Installation, Roughing In Truck Carries Own Power Supply ..... Sep. 94
Insulation, Chart Gives Correct Insulation Thickness to Prevent Moisture Condensation ..... Aug. 84
Reducing Heat Loss of House Increases Comfort Improves Performance of Heating Plant ..... Oct. 74

Jaffe, Sam, Six Brothers Make Heating History in Southern California ..... Jan. 74
Jones, F. B., What's Ahead for House Heating? Jul. 79

Kaiser Aluminum Expands for Emergency ..... Sep. 113
Keep Mailing Lists Accurate, Paul Lockwood ..... Sep. 84
Kiss, J. Archer, Human Tensions — Unique Approach to Selling ..... Jan. 103
Knight, Ted, Retail Sales Boost Shop Volume ..... May 74
Tin Horse Keeps Sheet Metal Shop in the Public Eye ..... Nov. 60
Kruckman, Arnold, Arrangements for Defense ..... Sep. 85
Basing Point Veto ..... Jul. 75
Change in Control Planning ..... Nov. 67
Government by Smear ..... Jan. 77
Housing for Middle Income Groups ..... Mar. 81
Mechanics of DPA ..... Oct. 63
Restrictive Orders Increase ..... Dec. 67
Taft vs. Truman ..... Apr. 75
Tariff Conference and the Industry ..... May 77
The New Truman ..... Feb. 74
The War Message ..... Aug. 73
Vital Legislation to be Debated ..... Jan. 113

LaSalvia, James J., Fundamentals of Calculating Heating and Cooling Loads, Part (IV) ..... Feb. 84
Latimer, Robert A., Glycol Vapor, Germicidal Lamps Save Monkeys ..... Aug. 87
Heating Dealer Branches Out — Boosts Volume ..... Nov. 77
High Speed Service Plan Increases Heating Sales Volume ..... Jun. 90
Rolling Showroom Rescues Heating Business ..... Sep. 98
Shop Inspection Sells Heating Plants ..... Jul. 87
Layouts for Perimeter Heating, Rogers Follansbee and W. L. Thomson ..... Dec. 71
Lifting in the Shop — Right and Wrong, W. Schweisheimer, M.D. ..... Nov. 97
Limbert, Wayne, Prefabricated Chimneys Build Profits for Heating Contractors ..... Aug. 79
Lockwood, Paul, Keep Mailing Lists Accurate ..... Sep. 84
Reducing the Cost of Business Letters ..... Aug. 73

McDonald, C. E., You Control Your Sales Future ..... Jan. 106
Maher, R. E., Sheet Metal Shop Stresses Service ..... Apr. 114
Main, R. V., Cleveland Plan of Sales Promotion Can Increase 1950 Profit Volume ..... May 67
Mansell, Rick, Aluminum Coated Steel Offers Many Fabrication Advantages ..... Mar. 103
Basic Types of Welding Operations ..... Dec. 97
Soldering — Convenient & Economical Means of Joining Metals ..... Jan. 108
Welding Processes and Their Use in Industrial Fabrication ..... Nov. 87
Mariner, Joseph V., Air Washers Cool Type Setting Plant ..... Jun. 84
Markstein, David, Customers' Signs Help Your Business ..... Sep. 80
How to Cut Trucking Costs ..... Apr. 68
New Census Figures — Valuable Sales Tool for Heating Industry ..... Jun. 68
Publicity Can Be a Sales Help ..... Oct. 54
Radio Advertising Can Fit *Indoor Comfort* Promotion ..... Feb. 62
Selective Hiring Strengthens Organization for Competitive Effort ..... Mar. 73
Turn Objections Into Sales Points ..... Jul. 67
Masonry Drills, Sharpening Carbide Tipped Masonry Drills ..... Oct. 92
Material Handling, Huge Trailers Cut Material Handling Cost — Increase Efficiency ..... Mar. 97
Mechanics of DPA, Arnold Kruckman ..... Oct. 63
Metal Action in Braking, Ernest E. Zideck ..... Jan. 164
Miniature Heating Plant a Sales Puller ..... Mar. 80
Mobilization and the Heating Industry ..... Aug. 67

Nason, R. C., Dust Collecting in a Monument Plant ..... Apr. 103
Sheet Steel Covers on Refinery Towers Prove Contractors' Fabricating Skill ..... Feb. 100
United Nations Secretariat Building Uses Miles of Stainless Steel Flashing ..... Jun. 97
Natural Gas and Residential Heating, L. Ourusoff ..... Jun. 91
Nelson, R. M., Your Business in 1950 ..... Apr. 79
Neubecker, William, Base Intersected by Round Branches ..... Apr. 106
Elbow Intersecting Round Pipe ..... Feb. 108
New Census Figures — Valuable Sales Tool for Heating Industry, David Markstein ..... Jun. 68
New Census Can Help Your Business ..... Mar. 69
New Heating Theory Gains Acceptance ..... Dec. 55
New Truman, The, Arnold Kruckman ..... Feb. 74
Newspaper Advertising — Key to Success ..... Jun. 66
Nichols, H. M., Anti Spin Vanes Reduce Wear in Collector ..... Jul. 108
1950 Will Reward Aggressive Sellers ..... Feb. 61
19 Suspended Heaters Fill Acre Warehouse ..... Oct. 67

Ogamowski, K., Workability of Galvanized Steel Sheets Improved by Continuous Coating Process ..... Aug. 94
Oil Burners, Warm Air Furnaces and Oil Burners, 1949 Shipments ..... Apr. 85
Oil Burning Equipment Installation Standards of the National Board of Fire Underwriters ..... Feb. 91
Oil Heating, Correct Nozzle Vital in Oil Heating ..... Apr. 86
O'Keeffe, Jr., W. F., Puttyless Aluminum Skylights Change Porches Into Recreation Rooms — Mean Profit for You ..... May 102
Older Worker and His Place in Industry, The, W. Schweisheimer, M.D. ..... Apr. 66

1190 Tons of Ductwork, L. T. Brohnke ..... Oct. 85
One Million Furnaces ..... Jul. 65
Open for Discussion, What's Wrong with CAC?, Roy Warmee ..... Aug. 86
Ordinances Prohibiting Dust Exhaust Create Problem for Industry, Ernest E. Zideck ..... Jul. 104
Ott, O. W., Panel-Convection Cooling System for Homes and Offices ..... Feb. 77
Warm Air Perimeter Heating Applied to School Buildings ..... May 81
Ourusoff, L., Natural Gas and Residential Heating ..... Jun. 91
Overhead, Set Prices High Enough to Recover Overhead or Profits Will Vanish ..... Jul. 71
Overly, Lloyd H., Batten Roof Features Snap-On Cap ..... Nov. 91

Panel-Convection Cooling System for Homes and Office, O. W. Ott ..... Feb. 77
Paret, Richard E., Strength of Stainless Steel Proves to be Economy Factor ..... Jun. 101
Patterns, A-Type Ventilator (I) ..... Sep. 110
A-Type Ventilator (II) ..... Oct. 90
Base Intersected by Round Branches ..... Apr. 106
Compound Rectangular Elbow ..... Nov. 92
Compound Transition Elbow, Hugh B. Reid ..... Dec. 88
Elbow Intersecting Round Pipe ..... Feb. 108
Gravity Weather Cap ..... Jan. 161
Oblique Offset Pipe ..... Jun. 105
Square to Round Transformer ..... May 100
Taper Intersecting a Round Pipe at 90 Deg. Mar. 106
Two Equal Diameter Pipes Intersecting at 90 Deg. ..... Aug. 98
Y Branch Transformer ..... Jul. 102
Pensions — A Management Problem, William J. Casey, Part (I) ..... Jan. 75
Part (II) ..... Jul. 73
Perimeter Heating New Approach to *Indoor Comfort*, Rogers Follansbee and W. L. Thomson, Nov. 71
Perimeter Warm Air System Solves Problem of Heating Basementless Houses ..... Sep. 89
Peterson, John E., Warm Air Baseboard Heating Supplies Heat at Source of Heat Loss ..... Jun. 81
Prefabricated Chimneys Build Profits for Heating Contractors, Wayne Lambert ..... Aug. 79
Preparation of Heating Plant for Installation of Gas Burner, Lyle K. Hohn ..... Mar. 91
Pre-Plated Metals Offer Beauty, Ease of Fabrication, Carl C. Stroever ..... Jan. 157
Press Brake, How to Make Tubing in a Power Press ..... Apr. 106
Profit Possibilities in Package Blowers, Part (I) ..... Jan. 130
Part (II) ..... Feb. 81
Publicity Can Be a Sales Help, David Markstein ..... Oct. 54
Puttyless Aluminum Skylights Change Porches Into Recreation Rooms — Mean Profit for You, W. F. O'Keeffe, Jr. ..... May 102

Racine Contractor Handles Sheet Metal Work on Wright-Designed Tower ..... Jul. 97
Radio Advertising Can Fit Into *Indoor Comfort* Promotion ..... Feb. 62
Recommendations for Control of Industry ..... Oct. 61
Reducing Heat Loss of House Increases Comfort Improves Performance of Heating Plant, Henry J. Wingate ..... Oct. 74
Reducing the Cost of Business Letters, Paul Lockwood ..... Aug. 73
Regional Use of Steel Causes Shortages ..... Oct. 78
Regulations and Controls, Recommendations for Control of Industry ..... Oct. 61
Reid, Hugh B., A-Type Ventilator (I) ..... Sep. 110
A-Type Ventilator (II) ..... Oct. 90
Compound Rectangular Elbow ..... Nov. 92
Compound Transition Elbow ..... Dec. 88
Gravity Weather Cap ..... Jan. 161
Oblique Offset Pipe ..... Jun. 105
Square to Round Transformer ..... May 100
Taper Intersecting a Round Pipe at 90 Deg. Mar. 106
Two Equal Diameter Pipes Intersecting at 90 Deg. ..... Aug. 98
Y Branch Transformer ..... Jul. 102
Relax and You'll Live Longer ..... Mar. 77
Restrictive Orders Increase, Arnold Kruckman. Dec. 67
Retail Sales Boost Shop Volume, Ted Knight .. May 74
Right to Work ..... Apr. 65
Roberts, Arthur, Boost Sales with Direct-Mail .. Aug. 68
Complete Records Support Tax Deductions .. Oct. 59
Controlling Overhead Expense Strengthens Business Operation ..... Nov. 65
Cost Control Guards Profit ..... Jan. 108
Depreciation — Important Profit Factor ..... Dec. 65
Five Phases of Business Management for *Indoor Comfort* Dealers ..... Mar. 70
Semi-Fixed Assets Can Be Dangerous ..... Apr. 70
Set Prices High Enough to Recover Overhead or Profits Will Vanish ..... Jul. 71
Rocke, M., Industrial Market for Propeller Fans ..... Sep. 103
Rolling Showroom Rescues Heating Business, Robert A. Latimer ..... Sep. 98
Roofing, Batten Roof Features Snap-On Cap .. Nov. 91
Batten Seam Roof of Monel Metal Utilizes New Type of Pan ..... Feb. 104
Copper Roof on U. S. Capitol Features Metal Battens, Lawrence Gickner ..... May 95
Roofing Shingles of Light Gauge Metal, Ernest E. Zideck ..... Mar. 101
Roughing In Truck Carries Own Power Supply . Sep. 93
Rowe, Carl B., Design of Ventilating Hoods for Grease Filter Applications, Part (I) ..... Mar. 104
Part (II) ..... May 105
Rudolph, Walter, Heating Gymnasium Offers Sheet Metal Problems ..... Feb. 97

(Please turn to page 121)

Architectural applications offer a big field to fabricators of Stainless Steel

This Overly-Goodwin batten-type Stainless Steel dome was erected in 13 working days by a crew of the Overly Manufacturing Company, Greensburg, Pa. Installed on the Lake County Courthouse, Gary, Ind., it was fabricated from U·S·S 18-8 Stainless Steel sheets.

Architects are fully aware of the decorative and structural possibilities of Stainless Steel. As a result, more and more entrances, doors, door and window frames, marquees, roofs, railings, wainscotings and spandrels are being designed to take advantage of Stainless' corrosion resistance, beauty and freedom from costly maintenance.

Remodeling jobs as well as new construction are being referred to fabricators who specialize in working in Stainless Steel. Shops that maintain consistently high standards of workmanship are turning out jobs that meet the most rigid specifications.

In U·S·S Stainless Steel, fabricators have found an outstanding material for such architectural applications. A complete selection of compositions and finishes is available in sheets, strip, bars, wire, tubular sections—every form required for efficient fabrication and satisfactory performance.

If you have any questions concerning the application of Stainless Steel on jobs like this, ask for the assistance of our Stainless Steel engineers. They'll be glad to help you.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

S-2004

UNITED STATES STEEL

From all of us to all of you

a Very Merry Xmas

Simplonic SYSTEM T.M.

Launeck FURNACE PIPE & FITTINGS

Write for free catalog and on the Air Distribution Institute Booklet "Standardized Fittings"

CLAYTON & LAMBERT MFG. CO., Louisville 10, Ky

NEW LITERATURE

(Use coupon on page 105)

Furnace Catalog 377

Every model in the Superfex gas line is contained in new catalog, along with selection charts relating to input, circulation, AGA rating, and complete furnace specifications.

Capacities of units range from 60,000 Btu to 150,000 Btu input.

Perfection Stove Co., Cleveland 4, Ohio

Metalworking Machines & Tools 378

A new 60 page catalog illustrates and describes metalworking machines and other tools in the Delta line of 53 machines, 246 models, and more than 1300 accessories. Includes complete detailed information on specifications, prices, motor recommendations, and accessories.

Delta Mfg. Div., Rockwell Mfg. Co., Milwaukee, Wis.

Small Welder 379

Bulletin W-71-1, covering the P & H Model TR-130A ac welder, has just been printed. The bulletin lists all the features of this limited input welder and illustrates a number of its applications.

Model TR-130A has a welding service range of from 20 to 130 amperes and has the Dial-lectric heat control. Capacity of the model makes it valuable for the welding requirements of shops, garages, fabricators, farmers, etc.

Harnischfeger Corp., Welding Div., Milwaukee, Wis.

Gas Meter Flow Time Table Card 380

A pocket size chart in card form conveniently converts the flow through gas meters into cubic feet per hour.

Rate of flow is quickly determined by timing an interval, in seconds, for one revolution of the test dial which establishes the rate of flow. The hourly flow is read from rates listed under test dials capacities ranging from ½ to 3 cubic feet.

Available from the manufacturer without obligation.

Reinhard Bros. Co., Minneapolis, Minn.

Gas Fired Furnaces 381

New bulletins describe gas fired furnaces designed for warm air perimeter heating installations. Blowers are spring mounted at top of units and warm air is discharged at the bottom of the furnace.

Model M2G is rated at an input of 75,000 Btuh and Model R9G is rated at 150,000 Btuh. Both models are approved for use with all gases, natural, mixed, manufactured and LP.

International Oil Burner Co., St. Louis 10, Mo.

Design and construction of industrial buildings call for detailed planning. Although defense requirements restrict the supply of Alcoa Industrial Building Sheet, Alcoa is not limiting its engineering assistance to designers and erectors. That is the reason for this message.

Easy to handle, Alcoa Industrial Building Sheet goes up fast, eliminates painting costs and time.

Before you plan another building... get these facts on Aluminum!

Today, when man power shortages call for every worker to be engaged in production, plant managers appreciate, more than ever, the extra worth of buildings clad in maintenance-free Alcoa Industrial Building Sheet.

All the data you need to design and erect buildings using Alcoa Industrial Building Sheet have been assembled in this useful, new booklet. Mail the coupon today for your free copy. For price and delivery information, call your local distributor or Alcoa Sales office. You'll find them listed under "Aluminum" in your classified telephone directory. ALUMINUM COMPANY OF AMERICA, 1472M Gulf Building, Pittsburgh 19, Pennsylvania.

For complete details MAIL THIS COUPON TODAY

Aluminum Company of America,
1472M Gulf Bldg., Pittsburgh 19, Pa.

Please send me engineering and application data on Alcoa Industrial Building Sheet. (Booklet AD-247).

Name _____

Company _____

Address _____

City _____ State _____

ALCOA INDUSTRIAL BUILDING SHEET

ALCOA ALUMINUM

FOR trouble-free Gas Appliances

USE THERMAC

HM Appliance Regulators

1. Provides constant pressures, constant BTU input and constant flame height.
2. Eliminates pilot light failure due to fluctuating pressures. Assures proper operation of automatic controls.
3. High capacity, close control. Low maintenance.
4. Aluminum alloy, light weight. Sizes: ⅛" to 2½" IPS.

APPLIANCE BUILDERS CHOOSE THERMAC

Millions of THERMAC Gas Appliance Regulators are in service today on gas furnaces, space heaters, conversion burners, refrigerators, water heaters, air conditioners, boilers, dryers, etc. More and more manufacturers are going to THERMAC simply because THERMAC Regulators are *DEPENDABLE* 24 hours a day under all operating conditions. The reputation of a fine appliance depends in no small degree upon the behavior and control of its gas regulator. Play safe. Use THERMAC—a product with wide national acceptance.

SEND FOR complete literature and prices

THERMAC COMPANY

800 East 108th Street • Los Angeles 2, Calif.

"20 years experience in building gas controls."

NEW LITERATURE

(Use coupon on page 105)

Anti-Corrosion Coating 382

Corrosion resistance superior to conventional zinc coatings with cost savings is claimed for Zincilate, the one coat, self-protecting, anti-corrosion coating described in an 8 page illustrated technical bulletin just published.

The bulletin presents case histories on companies and typical applications showing Zincilate's resistance to severe abrasive and corrosive conditions, complete specifications for the two Zincilate formulations, and data on surface preparation and methods of application.
Industrial Metal Protectives, Inc., Dayton, Ohio

Industrial Oil Burner 383

Bulletin describes Type R industrial oil burner of the horizontal, rotary atomizing type to burn No. 6 oil or lighter. These burners are available in the nominal ratings of 9, 16, 25, 35, 50, and 60 gallons per hour and are equipped with the oil Volumeter which allows use of various grades of oil without changes of adjustment. They may be used for many industrial applications.

The new industrial burner has a gear-type circulating pump, which runs at low speed, maintaining a constant supply of oil in the reservoir. The reservoir provides a head of oil at all times over the metering pump which is submerged in the reservoir. Any air drawn into the line is automatically vented from the top of the reservoir thus keeping the oil, in which the metering pump is submerged, always free of air.
Iron Fireman Mfg. Co., Portland 1, Ore.

Oil Burner Viscosity Control System . . . 384

Viscosity control system for Ray oil burners is described in an 8 page illustrated bulletin. Design of the control valve in the system has been changed to use studs and nuts in place of cap screws, so that the viscosity valve can be removed repeatedly without stripping the threads in the aluminum reservoir. Other changes in the system are also described in the booklet, catalog Unit F.

Catalog Unit G describing the company's fully automatic burner types AR-131, 134-141 and 144 in size 0 to 8, has also been re-issued with substantial changes and illustrations.

Catalog Unit J describes direct drive oil burners, for manual or semi-automatic operation. Three new types have been added to this line and a large capacity chart has been incorporated, along with descriptions of equipment used with the units.
Ray Oil Burner Co., San Francisco, Calif.

Get this Business!

with today's *Best Buy* for...

Sized Right!

Priced Right!

Shipped Assembled!

Small Houses

Multi-Family Apartments

Low-Cost Housing Projects

Mueller Climatrol

Type 111 Gas Gravity Furnace

Fuel-thrifty 90,000 Btu Steel Furnace
—shipped pre-assembled for quick installation

Dealers from coast to coast can tell you that the new low-cost Mueller Climatrol Type 111 is getting them the small home and project business — volume business at volume profits. When you see it win sale after sale of multiple installations — you'll be just as enthusiastic!

Here are the all-around money-making advantages of this new Mueller Climatrol Design:

✓ [illegible] —only 25½" wide. Goes through any door easily.

✓ [illegible] — shipped *pre-assembled*, with a solid base and leveling screws to eliminate concrete base and grouting.

✓ [illegible] — nationally known for 95 years, the Mueller name is a mark of quality accepted by builders and buyers everywhere.

✓ [illegible] — handsomely designed, finished in durable Mueller crinkle green enamel.

Order now to meet the sure volume demand. Prove to yourself that the Type 111 has everything it takes to get you the small home business. Write for complete details. *L. J. Mueller Furnace Company, 2169 W. Oklahoma Ave., Milwaukee 15, Wis.*

A low-cost furnace with all these outstanding values!

1. **All welded steel heat-exchanger and radiator** — cleanable through conveniently located access panels; updraft design.
2. **Durable cast-iron drilled-port burner** — with large single-port, non-clogging air shutter.
3. **Heavy-gauge steel cabinet** — finished in handsome Mueller green — insulated with laminated asbestos and aluminum foil.
4. **Solid steel base** — with four adjustable leveling screws for easy installation.
5. **Compact, easy to handle, space-saving** — dimensions: 51" high, 25½" wide, 26½" deep. (Available with pitch-type bonnet.)
6. **Shipped completely assembled** — arrives in two packages: one for burner and trim, the other for assembled heat-exchanger and cabinet.
7. **Approved by American Gas Association** — for all gases and high-altitude installation with full rating.

93rd Anniversary

MUELLER Climatrol

D-109

SEE OUR EXHIBIT

10th International Heating & Ventilating Exposition
Philadelphia, Pennsylvania • Booths 304, 306 and 308

Alnor Velometer

gives instant, direct reading of Air Velocity . . . Anywhere!

Here is a precision-built, self-contained, portable instrument that gives instant, accurate reading of air velocities—anywhere. Measures speed of flow through ducts, grilles, motors, furnaces, etc., or in the open. Needs no calculations or reference charts. Anyone can use it and get accurate measurements. Available in a wide range of scales, and with a wide assortment of jets and fittings if needed. You'll want full details and prices, so write for Bulletin No. 2448-G. Illinois Testing Laboratories, Inc., Room 538, 420 N. La Salle Street, Chicago 10, Ill.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

NEW LITERATURE

(Use Coupon on Page 105)

Combustion Chamber Reference Table . . . 385

A combustion chamber reference table is designed to aid purchasing agents, salesmen, and installation men in selecting correctly sized combustion chambers. Lists most of the prominent furnace series and the corresponding Lite-Cast combustion chamber which is adaptable.

Monogram Products Co., Philadelphia 4, Penn.

Ventilators, Flashing, & Skylights 386

Skylights, roof ventilators, and through wall flashing are described in three folders currently available.

Skylights feature structural strength, weathertightness, and positive condensation drainage. Roof ventilators are of the uplblast power type, are equipped with automatic opening and closing weathertight dampers. Vanco-Bondtite 3-way flashing bonds the wall in three directions: longitudinally, laterally, and vertically. It consists of 3/16 in. deep dovetail shape keys cross-wise 3 in. on center with continued similar and reversed depressions to accomplish a longitudinal and vertical bond. Longitudinal depressions 4 in. apart provide the lateral bond.

E. Van Noorden Co., Boston 19, Mass.

Wall Heater Vent 387

Wall heater vent that can be installed with safety within 3/8 in. of combustible walls is recent development known as QC (Quick-Coupling) Metalbestos Wallvent. Unit embodies the double wall construction found in other products of the Metalbestos venting line. New rectangular design allows the vent to be placed within standard 2 ft. by 4 in. walls without the expense of chi-kee furring, furring out or providing metal sheathing.

As the heater operates, inner flue pipe carries off hot combustion gases. Insulating air between the double walls confines heat to the inner pipe and keeps the outer aluminum casing and adjacent building walls cool. Air entering the ventilating holes creates circulation between the building walls and the vent pipe, providing an additional cooling effect on surrounding wall surfaces.

Furnished in 3, 4, and 5 ft. lengths, this Wallvent fits over the wall heater's flue nipple and extends through the ceiling where the round adapter connects to standard Metalbestos round pipe to make up the rest of the vent unit.

Made of corrosion resistant aluminum, the unit is listed by U.L. as a Type B gas vent without restrictions. It has been given additional approval for use within 3/8 in. of combustible walls.

William Wallace Co., Belmont, Calif.

Performance with a capital P

PACKARD
fractional horsepower
MOTORS

There is no question about the outstanding performance record of Packard fractional horsepower motors—their proved ability to create customer good will and increase the value and trade acceptance of your products.

Hundreds of thousands of Packard quality motors—all marked by rugged design, expert workmanship and finest materials—stand as evidence of this superiority.

Packard specializes in the manufacture of fractional horsepower motors. Our resources . . . our experienced engineering and manufacturing know-how in motor building have been concentrated for the past 34 years in this one field.

That's why Packard's reputation for plus-performance is described in capital letters—why it will pay you to specify Packard fractional horsepower motors . . . for quick service, complete satisfaction and lasting dependability.

GM GENERAL MOTORS

Packard

Packard Electric Division, General Motors Corporation
Warren, Ohio

DEPENDABLE APPLIANCE MOTORS FOR THIRTY-FOUR YEARS

SAL-MO ASBESTOS
AIRCELL PIPE COVERING
SAL-MO ASBESTOS AIRCELL PAPER
SAL-MO ASBESTOS PAPER
SAL-MO ASBESTOS
PIPE JOINT TAPE
SAL-MO
ASBESTOS
MILLBOARD
SALL MOUNTAIN COMPANY
Asbestos
UTILITY
SERVICE
ECONOMY
ASBESTOS PRODUCTS
SINCE 1886 . . . when Sall Mountain Company was organized, this Company has enjoyed a leading position in the manufacture and distribution of Asbestos Products and in making the fullest use of Asbestos for domestic and industrial insulation.
Our improved machinery and equipment, which are of the very latest design are important, but most important of all is our experience of many years in successfully solving the problems involving the many uses of Asbestos.
SALL MOUNTAIN COMPANY
ANDover 3-2414 • 176 W. ADAMS ST. • CHICAGO 2, ILLINOIS

NEW LITERATURE

(Use coupon on page 105)

Roof Drainage Equipment 388

A brochure on roof drainage equipment illustrates twenty different roof drains.

Complete roofing and drain specifications, sizing, and spacing tables are included.

Wade Mfg. Co., Elgin, Ill.

Electric & Pneumatic Tools 389

Over 135 electric and pneumatic tools are completely illustrated and described in this new, easy to read, time and work saving catalog. The new, 72 page catalog includes complete specifications, features, applications, and uses of drills, sanders, and many other types of portable power tools.

Skilsaw, Inc., Chicago 30, Ill.

Lever Operated Guillotine Shear 390

Folder describes the Finham Alligator, a new and efficient manually operated machine employing a novel method of application of the principle of progressive cutting. The moving blade, which is firmly supported at the point of contact with the sheet by a heavy steel thrust bar, is presented to the sheet at a substantially constant shearing angle throughout the entire duration of the cut and is actuated by a lever moving through 135 degrees. All the effort applied to the hand lever is used for cutting as there are no heavy blade return springs or balance weights to absorb it. Shear blades are easily detachable for re-grinding.

British Overseas Mart, Inc., New York 18, N.Y.

Tinplate Handbook 391

The steelmaking and tinning processes used in the manufacture of both hot dipped and electrolytic tinplate are summarized and the factors which determine the suitability of the various types of tinplate for any particular application are discussed in the Tinplate Handbook. The major uses of the principal grades of tinplate are indicated and methods of testing mechanical properties, coating thicknesses and lacquer adhesion are briefly described.

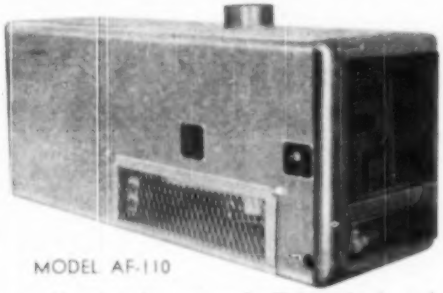
Trade terms used by the British and American tinplate industries are defined and methods of grading and classifying the finished tinplates are reviewed.

Gauge tables and conversion tables covering a wide range of coating weights and thicknesses will be of value to all tinplate consumers.

Address requests directly to

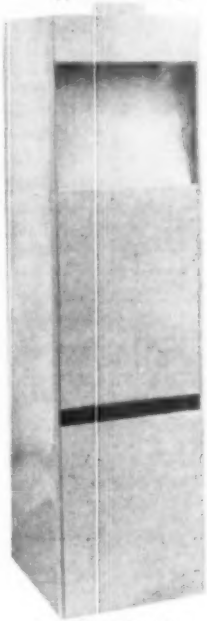
Tin Research Institute, Inc., 492 West Sixth Ave., Columbus 1, Ohio

JOHN ZINK
Central GAS HEATERS



MODEL AF-110

Here is truly a universal, efficient, simple, and compact CENTRAL HEATING UNIT. Fully automatic, it is a complete packaged unit ready for installation. The two heaters shown are almost identical in operation and design of the heat exchanger. The two different types of casings are furnished to meet requirements for a particular application.



MODEL HB-110

Heaters may be installed in the basement, attic, service closet, or utility room of a home. The AF-110 may be installed even under the house if certain provisions are made for the draft diverter. For industrial applications, it may be installed on a shelf or balcony; as a suspended heater and as a duct heater.

Each John Zink Central Gas Heater is equipped with an automatic safety shut-off that is really automatic.

The John Zink Central Gas Heater is designed as a winter air conditioner with a summer switch to provide air circulation during warm weather.

Write for Literature

JOHN ZINK COMPANY

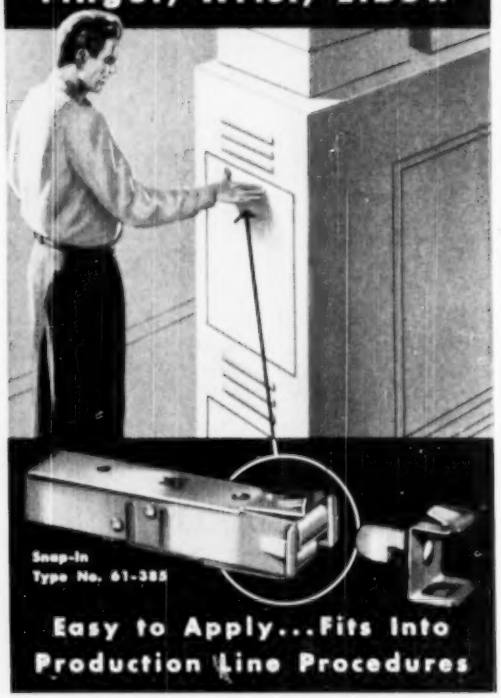
4401 South Peoria

TULSA, OKLAHOMA

New York — Salt Lake City — Houston — Los Angeles

NATIONAL TUTCH LATCH

Opens Cabinet Doors Automatically with the Gentle Touch of Finger, Wrist, Elbow



Easy to Apply...Fits Into Production Line Procedures

More beauty for your metal products . . . more convenience for the ultimate user . . . easy operation . . . sure, positive latching action . . . all at small cost. Tutch Latch eliminates the need of exterior handles or knobs. It can be "snapped in" or spot welded . . . inside, out of sight. It's a natural for your use.

Many Logical Product Applications

Tutch Latch is perfect for kitchen cabinets, utility cabinets, space heaters, medicine chests, in fact most any product with swing door. Specify whether metal or wood application.

Write Us For Complete Information

Distinctive Hardware... All From 1 Source

NATIONAL LOCK COMPANY
Rockford • Illinois

SALES SENSE

By Jack Bedford

A timid customer entered the *Indoor Comfort* salesroom and asked the salesman, "Do you keep heating equipment?"

"No," snapped the bright young salesman, "we sell it."

"That may be," said the customer as he walked toward the door, "but you'll keep the equipment you might have sold me."

$ $ $

The salesman who does things is bound to make mistakes, but he never makes the biggest mistake of all—that of doing nothing.

$ $ $

"My baby is going to be a great politician when he grows up," said the salesman, proudly regarding his six-month old offspring.

"Now, how can you possibly tell that?" asked the contractor.

"It's obvious," was the salesman's reply. "That kid can say more things that sound good and mean nothing than any politician I've ever seen."

$ $ $

Keep your mind on your work, not your work on your mind is the advice of the Salesman's Sage.

Indoor Comfort Dealer: "Forty dollars! That's outrageous—I wouldn't pay Michelangelo that much to paint my store."

Painter: "Listen! If he does the job for any less, we'll picket the place."

$ $ $

Selling without a little humor now and then is like an automobile without springs. They are both very bumpy and uncomfortable.

$ $ $

A heating salesman, tired of his job, gave it up and joined the local police force. Several months later the dealer asked him how he liked being a policeman.

"Well," the former salesman replied, "the pay and the hours are good, but what I like best of all is that the customer is always wrong."

$ $ $

Women seem to be getting men's wages today; but then, they always have.

$ $ $

Many salesmen spend half of their time wishing for things that they could have if they didn't spend half of their time wishing.

$ $ $

Sales Sense is applying sound selling strategy in all types of selling. This brings success. All salesmen want to succeed. Some want to succeed so badly they're willing to work for it.

(From page 112)

Sound Merchandising Ideas Help Sell Electric Air Filters....Oct. 71
Sales, Boost Sales with Direct-Mail....Aug. 68
Building a Profitable Mailing List....Nov. 62
Cleveland Plan of Sales Promotion Can Increase 1950 Profit Volume....May 67
Customer Speaks His Mind, A....Feb. 66
Drivers Can Be Salesmen....Sep. 83
High Speed Service Plan Increases Heating Sales Volume....Jun. 86
Home Demonstration Sells Furnaces....Oct. 56
Human Tensions — Unique Approach to Selling, J. Archer Kiss....Jan. 103
Keep Mailing Lists Accurate....Sep. 84
Miniature Heating Plant a Sales Puller....Mar. 80
New Census Figures — Valuable Sales Tool for Heating Industry....Jun. 68
Profit Possibilities in Package Blowers,
Part (I)....Jan. 130
Part (II)....Feb. 81
Retail Sales Boost Shop Volume....May 74
Salesmen's Promises Must Be Controlled....Sep. 78
Shop Inspection Sells Heating Plants....Jul. 87
Sound Merchandising Ideas Help Sell Electric Air Filters....Oct. 71
Turn Objections Into Sales Points....Jul. 67
You Control Your Sales Future....Jan. 106
Salesmen's Promises Must Be Controlled, Albert W. Gray....Sep. 78
Schaphorst, W. F., Chart Compares Cost of Fuel....Jan. 166
Schweisheimer, W., M.D., Correct Practice in Garage Ventilation....Aug. 104
Lifting in the Shop — Right and Wrong....Nov. 97
Older Worker and His Place in Industry, The, Apr. 66
Selection of Diffuser-Lighting Units for Air Conditioning, F. Honerkamp....Nov. 74
Selective Hiring Strengthens Organization for Competitive Effort, David Markstein....Mar. 73
Seltz, D. D., Collection Methods that Speed Payments....Aug. 70
Semi-Fixed Assets Can Be Dangerous, Arthur Roberts....Apr. 70
Service, Adjustment for Continuous Air Circulation Using Duct Thermometers....Sep. 96
Balancing the Heating System for *Indoor Comfort*, Part (I)....Sep. 94
Part (II)....Oct. 76
Part (III)....Nov. 79
Part (IV)....Dec. 75
Curiosity Causes Service Calls Says this Service Man....Mar. 90
Electronic Secretary for Night Service Calls, Apr. 73
Heating Dealer Branches Out — Boosts Volume....Nov. 77
High Speed Service Plan Increases Heating Sales Volume....Jun. 86
Sheet Metal Shop Stresses Service....Apr. 113

WHOLESALERS RECOMMEND

SCHAEFER BRUSHES!

because...

They know that by recommending Schaefer brushes their customers will be satisfied with the results that only the finest made will give.
Schaefer brushes are fully guaranteed against inferior materials or faulty workmanship . . . assures you of long efficient wear. There is a Schaefer brush to solve every cleaning need — always insist on Schaefer "Job-Tested" brushes.

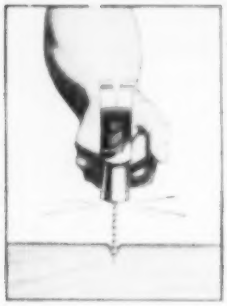
Send Your Cleaning Problems to Schaefer

If you have an unusual cleaning problem pass it along to Schaefer's experts for prompt solution.

SCHAEFER BRUSH MFG. CO.
117 W. Walker St., Milwaukee 4, Wis.

Please send more information about your service for solving special cleaning problems.
Name ..... Title .....
Company Name .....
Address .....
City ..... State .....

SCHAEFER BRUSH MFG. CO. *"Always Buy Schaefer — It's Safer."*
117 W. WALKER STREET, MILWAUKEE 4, WISCONSIN



in to
stay
when
you use

P-K

Hardened SCREWNAILS

for fastening sheet metal to wood

• You drive it in like a nail, and as it spirals into the wood, it holds like a screw.

• P-K Screwnails are hardened. They won't bend or break, one, driven home, they won't work loose, or back out, even under the toughest vibration, expansion and contraction. Because each one makes a stronger fastening, fewer Screwnails need to be used on most jobs.

• The hard, needle point pierces lighter gauges of sheet metal with ease. For heavier sheets, holes can be punched first with a Screwnail Punch.

• Try P-K Screwnails, next time, for a better, faster, stronger job . . . and remember . . . IF IT'S P-K, IT'S O.K. Sold everywhere through accredited Distributors.

PARKER-KALON*
FASTENING DEVICES
Makers Of The Original Self-Tapping Screws

Write for this folder

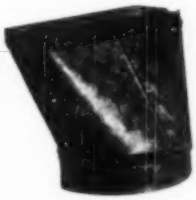
Gives sizes, head styles, Punch information, full instructions for use. Tells you the many ways Screwnails will help you do a better job. Parker-Kalon Corporation, 200 Varick Street, New York 14, N. Y.

*TRADE MARKS REG. U.S. PAT. OFF.

Set Prices High Enough to Recover Overhead or Profits Will Vanish, Arthur Roberts ..... Jul. 71
Sharon, R. F., Direct Fired Heaters Simplify — Cut Costs for Commercial-Industrial Applications ..... Jun. 89
Sharpening Carbide Tipped Masonry Drills .. Oct. 92
Sheet Metal Shop Stresses Service, R. E. Maher ..... Apr. 113
Sheet Metal Fabrication, Accent on Sheet Metal Work ..... Sep. 112
Aluminum Coated Steel Offers Many Fabrication Advantages ..... Mar. 108
Die Design for Sheet Metal Forming ..... Dec. 90
Metal Action in Braking ..... Jan. 164
180 Tons of Ductwork ..... Oct. 83
Pre-Plated Metals Offer Beauty, Ease of Fabrication ..... Jan. 157
Racine Contractor Handles Sheet Metal Work on Wright-Designed Tower ..... Jul. 97
Sheet Steel Covers on Refinery Towers Prove Contractor's Fabricating Skill ..... Feb. 100
Stainless Steel Fabrication, No Special Equipment Needed ..... Jan. 162
Sheet Steel Covers on Refinery Towers Prove Contractor's Fabricating Skill, R. C. Nason .. Feb. 100
Shop Inspection Sells Heating Plants, Robert Latimer ..... Jul. 87
Shop Layout, Building Design & Floor Plan for Large Metal Fabrication Plant ..... Apr. 111
Color Dynamics in the Sheet Metal Shop ..... Dec. 85
Gichner Plans Ideal Shop ..... Jun. 106
How to Plan a Sheet Metal Shop ..... Nov. 94
Simplified Bookkeeping System Solves Problems for Detroit Contractor, B. Anderson ..... Dec. 56
Simplified Job Ticket ..... Apr. 72
Six Brothers Make Heating History in Southern California, Sam Jaffe ..... Jun. 71
SMCNA, Code of Trade Practice ..... May 72
SMCNA Warm Air Heating Ordinance ..... Jan. 115
Social Security Law, Changes in Social Security Law ..... Oct. 58
Social Security Extension Brings Self-Employed Contractors Under Provision of the Act ..... Dec. 63
Soldering — Convenient & Economical Means of Joining Metals, Rick Mansell ..... Jun. 108
Sound Merchandising Ideas Help Sell Electric Air Filters, Walter Rudolph ..... Oct. 71
Spooner, Harry L., Accent on Sheet Metal Work Sep. 112
Stainless Steel Remodeling Job Helps Sheet Metal Contractor's Business .. Dec. 94
Stainless Steel, Strength of Stainless Steel Proves to be Economy Factor ..... Jun. 101
United Nations Secretariat Building Uses Miles of Stainless Steel Flashing ..... Jun. 97
Stainless Steel Fabrication, No Special Equipment Needed, Lawrence E. Gichner ... Jan. 162
Stainless Steel Remodeling Job Helps Sheet Metal Contractor's Business, Spooner, H. L. .. Dec. 94

Steel, Aluminum Coated Steel Offers Many Fabrication Advantages ..... Mar. 108
Regional Use of Steel Causes Shortages ..... Oct. 78
Survey Shows 500,000 Tons of Steel Required by Furnace Industry in 1950 ..... Nov. 63
Your Business in 1950 ..... Apr. 79
Steel and the Future, Benjamin F. Fairless ..... Oct. 87
Steel Production and Capacity Increase ..... Aug. 103
Strength of Stainless Steel Proves to be Economy Factor, Richard E. Paret ..... Jun. 101
Struever, Carl C., Pre-Plated Metals Offer Beauty, Ease of Fabrication ..... Jan. 157
Sullivan, A. M., Good Credit Rating Simplifies Purchasing ..... Jul. 68
Supplemental Design Factors for Ventilating and Exhaust Systems, Ernest E. Zideck ..... Sep. 106
Survey Shows 500,000 Tons of Steel Required by Furnace Industry in 1950 ..... Nov. 63
Suspended Installation in Printing Plant Conserves Valuable Floor Space ..... Jan. 121
Taft vs. Truman, Arnold Kruckman ..... Apr. 75
Tariff Conference and the Industry, Arnold Kruckman ..... May 77
Tarnoff, E. M., Warm Air Unit Heats Auto Salesrooms and Garages ..... Dec. 78
Taxes, Complete Records Support Tax Deductions ..... Oct. 59
How to Reduce Your Income Tax ..... Sep. 81
If You Lost Money in 1949 — Get a Tax Refund ..... Jan. 110
Television — Great Potential Medium for Heating and Sheet Metal Field, Ernest W. Fair ..... Sep. 76
Temperature and Heat Loss Characteristics of Concrete Floors, Harlan D. Bareither, Arthur N. Fleming, and Bryce E. Alberty,
Part (I) ..... Mar. 85
Part (II) ..... Apr. 88
Part (III) ..... May 83
Thomson, W. L., and Rogers Follansbee, Layouts for Perimeter Heating ..... Dec. 71
Perimeter Heating New Approach to *Indoor Comfort* ..... Nov. 71
Time Modulation Control Increases Comfort, Ralph Allen, Part (I) ..... Jul. 83
Part (II) ..... Aug. 82
Tin Horse Keeps Sheet Metal Shop in the Public Eye, Ted Knight ..... Nov. 60
Turn Objections Into Sales Points, David Markstein ..... Jul. 67
United Nations Secretariat Building Uses Miles of Stainless Steel Flashing, R. C. Nason ..... Jun. 97
Ventilation, Correct Practice in Garage Ventilation ..... Aug. 104
Design of Ventilating Hoods for Grease Filter Applications, Part (I) ..... Mar. 104
Part (II) ..... May 105

No. 112 BOOT


No. 110 BOOT

No. 113 BOOT

No. 111 BOOT

← No. 164 End of Line Center Takeoff. For use with 2 No. 163.

No. 160 Takeoff Round Pipe to carry branch in or below joist. →

GRAY *"Snap-Rite"*

FURNACE PIPE AND FITTINGS
AIR CONDITIONING PIPE AND FITTINGS

A complete line of Gravity and Forced Air Pipe and Fittings with our positive "SNAP-RITE" Lock for quick assembly and erection. Wall Stack and Fittings in 3¼" standard depths. Trunk Pipe and Fittings in 8" standard depths.

Write for Catalog

GRAY METAL PRODUCTS, INC.
30 Carlton Street
Rochester 7, New York

Supplemental Design Factors for Ventilating and Exhaust Systems ..... Sep. 106
Vital Legislation to be Debated, Arnold Kruckman ..... Jan. 113

Wadsworth, P. K., Balancing the Heating System for *Indoor Comfort*, Part (I) ..... Sep. 94
Part (II) ..... Oct. 76
Part (III) ..... Nov. 79
Part (IV) ..... Dec. 75
Walker, Beth, Home Demonstration Sells Furnaces ..... Oct. 56
War Message, The, Arnold Kruckman ..... Aug. 75
War Uses Took 38 Per Cent of Steel in 1943 .. Sep. 109
Warm Air Baseboard Heating Supplies Heat at Source of Heat Loss, John E. Peterson ..... Jun. 81
Warm Air Furnaces and Oil Burners, 1949 Shipments ..... Apr. 85
Warm Air Heating Code of New Castle, Ind. .. Feb. 64
Warm Air Heating Ordinance, SMCNA ..... Jan. 115
Warm Air Heating Preference Indicated by New Department of Labor Survey ..... Dec. 81
Warm Air Heats Large Buildings ..... Jan. 133
Warm Air Perimeter Heating Applied to School Buildings, O. W. Ott ..... May 81
Warm Air Unit Heats Auto Salesrooms and Garages, F. M. Tarnoff ..... Dec. 78
Warmee, Roy, What's Wrong with CAC? ..... Aug. 86
We Are Older Than We Thought ..... Jan. 112
Welch, Robert E., Drivers Can Be Salesmen .... Sep. 83
Welding, Basic Types of Welding Operations ... Dec. 97
Welding Processes and Their Use in Industrial Fabrication, Rick Mansell ..... Nov. 87
What's Ahead for House Heating?, F. B. Jones, Jul. 79
Wingate, Henry J., Reducing Heat Loss of House Increases Comfort Improves Performance of Heating Plant ..... Oct. 74
Workability of Galvanized Steel Sheets Improved by Continuous Coating Process, K. Oganowski ..... Aug. 93

Year of Contrasts ..... Jan. 101
You Control Your Sales Future, C. E. McDonald ..... Jan. 106
Your Business in 1950, R. M. Nelson ..... Apr. 79

Zideck, Ernest E., Building Design & Floor Plan for Large Metal Fabrication Plant .... Apr. 111
Die Design for Sheet Metal Forming ..... Dec. 90
Distillation Equipment of Acid-Resisting Metal ..... Oct. 94
Dust Collecting Work Benches ..... Aug. 100
Gichner Plans Ideal Shop ..... Jun. 106
Metal Action in Braking ..... Jan. 164
Ordinances Prohibiting Dust Exhaust Create Problem for Industry ..... Jul. 104
Roofing Shingles of Light Gauge Metal .... Mar. 101
Supplemental Design Factors for Ventilating and Exhaust Systems ..... Sep. 106

A WARM SEASONS GREETINGS

AS THE CHRISTMAS CANDLES are lighted this year, their inviting warmth brings a glow in our hearts — a glow of confidence so that some day the light they symbolize will show us the way to greater friendliness and good will

MERRY CHRISTMAS — HAPPY NEW YEAR

Rybolt

THE RYBOLT HEATER COMPANY

ASHLAND, OHIO

Randall

self-aligning
self-lubricating

PILLOW BLOCKS

GENERAL SERVICE
PILLOW BLOCK

Your assurance of quieter–longer lasting service . . .

You make sure of smooth, quiet operation for the life of your equipment when you specify Randall Pillow Blocks. Only Randalls have self-lubricating, graphited phosphor bronze or sintered bronze bushings in self-aligning, wool-felt-packed oil reservoir housings. You can afford Randall quality since the line is very complete and offers a type and size that is exactly right for the job. Write for Catalog 49 with complete data.

PILLOW BLOCKS
BUSHINGS
BAR STOCK
SHEET LUBRICATOR

Randall

GRAPHITED BEARINGS
THRUST WASHERS
BABBITTS
SAFETY COLLARS

RANDALL GRAPHITE BEARINGS, INC.

207 E. MARKET ST. LIMA, OHIO

For Today's Best Value

COMPARE

✓ FEATURES
✓ PERFORMANCE
✓ REPUTATION
✓ SALES HELP

then finally price and you'll settle on

SUN-RAY FULLY AUTOMATIC OIL BURNERS

Because they are built by one of the world's oldest and leading oil burner manufacturers.

Because they are endorsed and specified by architects, engineers, builders, realty managers, Federal, State and City departments everywhere.

Because they are used by banks, schools, churches, institutions, apartment houses, commercial buildings and thousands and thousands of satisfied home owners to whom operation of Sun-Ray burners has meant years of carefree, economical heating.

Because with our sales literature, newspaper mats, displays and signs we help you sell more Sun-Ray Burners more profitably.

Inquiries Invited from Furnace and Boiler Manufacturers

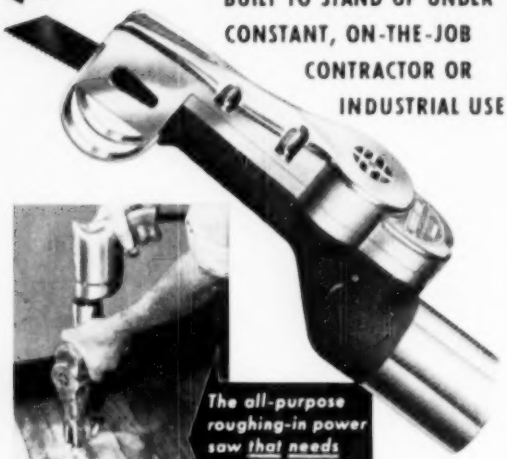
Sun-Ray Models from 0.7 to 25 g.p.h.

SUN-RAY BURNER MFG. CORP.

RCS SUPER SAW

AIR COOLED
PATS. PEND.

A JOURNEYMAN'S TOOL, BUILT TO STAND UP UNDER CONSTANT, ON-THE-JOB CONTRACTOR OR INDUSTRIAL USE



The all-purpose roughing-in power saw that needs no starting hole!

- **NO STARTING HOLE NEEDED** ...Simply place guide next to material and "rock" tool into an upright position.
- **CUTS RIGHT THRU IMBEDDED NAILS**...wood, plaster, iron pipe, sheet metal, "Transite" and most other materials—even in cramped quarters.
- **FITS ANY HEAVY DUTY ¼" or ⅜" DRILL** . . . as easy as changing bits! Overall length only 10¾", weight only 3 lbs. 6 ozs.
- **ANTI-FRICTION REPLACEABLE BEARINGS—BUILT-IN BLOWER** . . . Blower keeps tool comfortably cool even under continuous use—blows dust and chips away from cutting line. All friction surfaces are of "Oilite," phosphor bronze or high speed ball bearings. All wearing parts are replaceable.

Try it Yourself! *See the Super Saw at your jobbers! Inspect it, try it! You'll agree that no other tool offers Super Saw's lifetime construction at such low cost . . . no other tool provides such drastic reduction in labor costs!*

SEND THE COUPON TODAY

R.C.S. TOOL SALES CORPORATION
JOLIET, ILLINOIS, U.S.A.

Gentlemen:
Please send us Bulletin 12A and name of the nearest Super Saw distributor.

Name _____

Address _____

City _____ Zone _____ State _____

INDUSTRY ITEMS

ROBERT S. SCHNEIDER, general sales manager for Inland Steel Products Co., Milwaukee, Wis., manufacturers of steel building products and consumers' specialties, has announced the appointment of two new branch managers.

C. F. Gruenert

R. E. Wollert

C. F. Gruenert, manager of the company's Detroit branch, has been named to succeed A. E. Kirchgraber as manager of the Rochester-Buffalo branch, and R. E. Wollert has been appointed manager of the Detroit branch to succeed Mr. Gruenert. The Rochester-Buffalo branch supplies Milcor products to western and upstate New York, and northern Pennsylvania, while Detroit serves lower Michigan.

ACCORDING to a recent announcement, effective Dec. 1st, Clean Sweep soot remover will have a new name, and will be manufactured and sold by a new company, the Millet Product Co., P. O. Box 156, Lansing 9, Mich. The manufacturer states that other than the change in name, the product will remain the same. There is to be no change in ingredients, in the manufacturing plant or in the pricing or packaging.

METALBESTOS DIV. William Wallace Co., Belmont, Calif., announces the opening of a Los Angeles branch office at 612 S. Flower St. Manager of the new office will be Robert A. McHugh.

According to A. L. Hawley, Jr., vice president-sales manager, opening of the Los Angeles branch is a step in a program to provide greater assistance to jobbers and dealers and gain more intensive coverage of the national market for Metalbestos gas vent pipe and fittings.

ROY E. MAICHEL, 56, St. Louis branch sales representative for the Berger Manufacturing Div. Republic Steel Corp., died November 2. Mr. Maichel represented the sheet metal building products division for Berger in the St. Louis area since he joined the firm in 1937. He is survived by his wife, Emma.

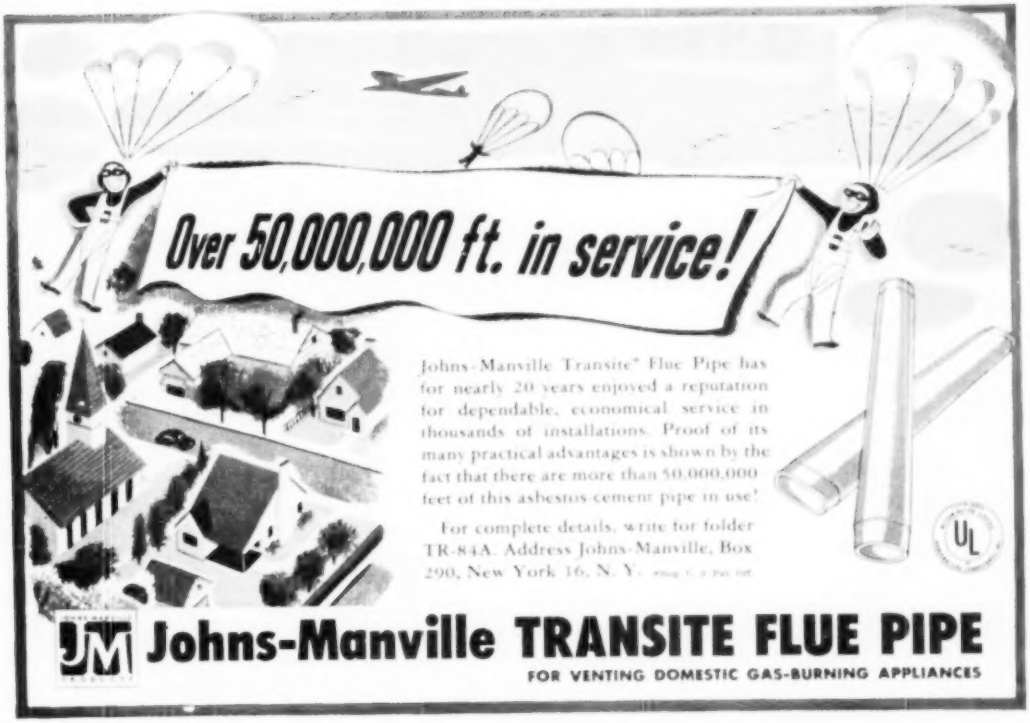
J. N. CRAWFORD, director of sales, Bryant Heater Div. Affiliated Gas Equipment, Inc., Cleveland, Ohio recently announced the opening of a branch office in Detroit, Mich. J. H. Swallow, formerly southern district

royal jet-flow

safe with children

Hot air grilles are located just below ceiling level . . . children cannot get burned on hot grilles, nor can furniture be ruined or scorched. These extra safety factors are just one of the many outstanding features that make the Royal Jet-Flow America's outstanding heating unit.

Write to Royal Heaters, Inc., Alhambra, California, for complete information.



HI-BOY or LOW

handles any forced air problem

SECURITY

The remarkable new

SECURITY

MODEL SFA FURNACE

Security leads the trend to compact efficiency with the new SFA Series. Adaptable to every domestic winter air conditioner situation. Versatile enough for conventional, basementless or utility room installations. Completely engineered for effortless, automatic heating. Yes, sir . . . the SFA brings greater economy and longer life to home heating!

Only Two Connections Necessary

Completely assembled at factory. Hook up just one gas and one power line! Filter racks optional at bottom, right or left. Each control can be removed without disturbing other wiring. You'll be amazed at its versatility. Available for all gases. Write or wire now for complete information, prices.

SECURITY MFG. CO.

1630 Oakland St., Kansas City 3, Mo.

Also manufacture the famous Security Heavy Duty Water Heater and full line of Gravity, All Purpose, and In A Wall Furnaces and Conversion Burners.

sales manager, has been appointed manager of the new branch located at 617 Central Detroit Warehouse, 10th and W. Fort Streets, Detroit.

Charles Lockhart, formerly assistant to Mr. Swallow, now becomes southern district sales manager with headquarters in Dallas, Texas.

J. A. Swallow

John Hellstrom

JOHN HELLSTROM, vice president of the American Air Filter Co., Inc., Louisville, Ky., has moved to San Francisco to become manager of the newly created Pacific division. Under his direct supervision will be the business activities of both American Air Filter Co. and its Herman Nelson Div. of Moline, Ill. in the Pacific territory. The Pacific division includes the offices and representatives in the states of California, Oregon, Washington, Idaho, Montana, Utah, Arizona, New Mexico, and the western part of Texas.

THREE NEW FIELD representatives have been added to the sales staff of the temperature controls division of the Perfex Corp., Milwaukee, Wis.

Hugh C. Cameron of Indianapolis, Ind., is newly appointed district manager for the state of Indiana. A native of Oxford, N. C., he recently had been a sales engineer for the Lustron Corp.

H. C. Cameron

W. P. McDowell

H. H. Hackett, Jr.

Hugh H. Hackett, Jr. of New York City, will serve as district manager for the states of Pennsylvania, Maryland, and Virgina. Before joining Perfex, he was associated as field engineer with the F. S. Stokes Machine Co. and the White House Chemical Co.

William P. McDowell has been assigned the task of appointing and training new Perfex distributors throughout the country. He will make his headquarters in Columbus, Ohio. For the past several years Mr. McDowell has been a sales representative for Williams Oil-O-Matic.

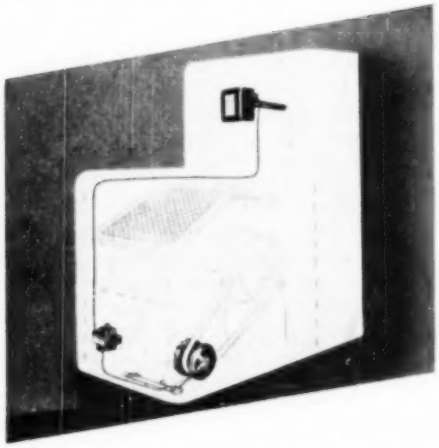
AVAILABLE PROFITABLE *and*

Every OWNER or PURCHASER OF A FORCED WARM AIR FURNACE IS A PROSPECT !

the

MASTER BLOWER-TROL

thermo-electric blower control



At a cost within the reach of the average home owner, you can now offer a control that does away with that first rush of cold air — ends drafts — hot and cold "layers" of air — "cold 70°", in fact it's real

comfort Flowing In

Sell Blower-trol. — it makes friends.

Ask for full information.

THE WHITE MANUFACTURING CO.

2368 University Ave. **St. Paul, Minnesota**

Van Dorn POWER

means faster finishing!

VAN DORN ELECTRIC SANDERS are fine tools-of-all-work that will speed up a raft of surfacing and finishing jobs in your shop. These versatile tools drive abrasive discs, saucer grinding wheels and "Whirlwind" wire cup brushes for smoothing down welds, removing surface irregularities and conditioning sheet metal before painting, removing rust, cleaning old ducts before repainting, and burnishing stainless steel.

Van Dorn Sanders are available in four models: the 7" Special Sander for intermittent service and touch-up jobs; the 7" Standard for general purposes; and the 7" and 9" Heavy-Duty models for continuous work and greater output. Every one is powered by a Van Dorn-built universal motor, *tailor-made* for the model it drives! See your nearby Van Dorn Distributor for a demonstration. Write for free catalog to: VAN DORN ELECTRIC TOOL CO., 782 Joppa Road, Towson 4, Md.

For Power Specify

"Van Dorn"

(Div. of Black & Decker Mfg. Co.)

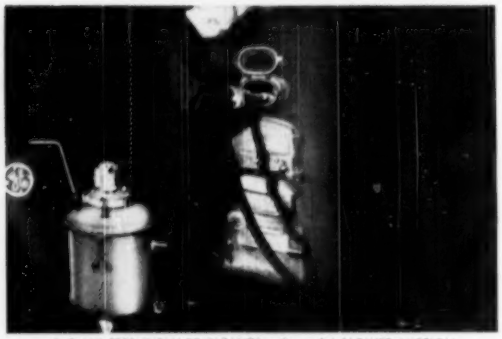
PORTABLE ELECTRIC **TOOLS**

DRILLS • BENCH GRINDERS • PORTO-SHEARS • HAMMERS

Here's Modern Equipment to

MAKE FURNACE-CLEANING CALLS

PAY OFF!



G-E AVI F908 FURNACE CLEANER a Powerful BLOWER SUCTION Machine—engineered to do the job Quickly, Thoroughly and at Low Cost

This easy-to-handle, high-vacuum cleaner (1 full h. p. AC-DC; 45" water lift; weight only 51 lbs.) makes a hit with clean-up crews . . . steps up their productiveness . . . leaves boilers and cellars cleaner.

Power unit is readily removed from tank and converted into a powerful BLOWER, by removing bag and substituting special coupling and guard.

G-E CHIMNEY CLEANING AND AIR DUCT EQUIPMENT For Use with Model AVI F908 ▶ Furnace Cleaner

Another ingenious contribution to speed clean-up jobs is the G-E Chimney-Cleaning Set. This equipment brings down the soot and gets it into the machine with a minimum of muss and fuss.

Revolving handle and vacuum hose fit through special shield which keeps falling soot from escaping into the cellar. As shown, set includes Shield, Crank, Chimney Flue Brush, Duct Brush and eight 4 ft. extensions.

YOUR FIRST STEP toward Lower Furnace Cleaning Costs and MORE Satisfied Customers is taken when you mail coupon below for this new G-E folder

Furnace and Boiler Cleaners

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, Dept. 22-4116
1285 Boston Ave., Bridgeport 2, Conn.

Certainly, I'm interested in more efficient Furnace Cleaning Equipment. Send the G-E Folder by return mail.

Name

Firm

Address

City Zone State

A TOTAL OF 475 oil burner dealers attended a Sundstrand fuel unit service lecture in Valley Stream, New York, on October 18th, sponsored by Sid Harvey, Inc. This lecture was one of a series given by Burdette Douglas, general service manager of the hydraulic division of the Sundstrand Machine Tool Co., manufacturers of Sundstrand fuel units.

Mr. Douglas showed, with colored slides, all the working parts of the fuel units and how to diagnose and correct service problems. He was assisted by Ed Mayfield, eastern sales manager of Sundstrand.

The lecture was repeated in Philadelphia on Friday, October 20th, for the benefit of the customers of Sid Harvey of Penn., Inc., and was attended by 435 of their dealers.

Washington Letter —

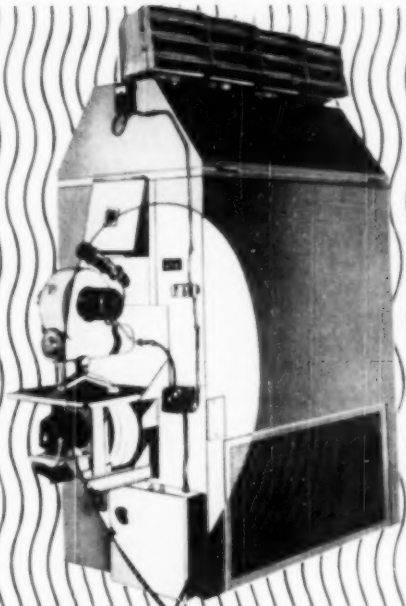
(From page 88)

expansion of abandoned camps, and construction of many new ones. You may get some idea of what the plan means when you realize it is intended eventually there shall be 11 million persons in our armed forces. This number of military personnel obviously poses all kinds of housing problems as well as problems for military equipment, which directly affect the military and civilian populations. Victory in any future war will depend more upon the industries and civilian work force of the nation than upon the actual fighting forces on the front line.

It is for this reason that we are told when total mobilization comes, which is apparently inherent in the plan, the civilian industrial defense organization will require the services of not less than 65 million and probably as many as 70 million workers. Where they will get 70 million workers, plus 11 million military personnel, out of a total population of 150 million is a problem that will require something of a miracle. It has been suggested that we may be able to induce some of our potential allies, already on our payrolls, in Europe and Asia, to send us some of their civilian surplus. And that opens other problems for contemplation which lead into too many byways for discussion here.

Marshall's four year plan is intended to rearm our own country and to rearm the friendly countries of Europe and Asia, if we really have any friends over there. When you let your imagination play upon this prospect, the stupendous industrial undertaking ahead is staggering. Something of this colossal global defense panorama was given by Marshall to the Business Advisory Council for the Department of Commerce at the meeting at Sea Island, in November.

Stop a minute to contemplate Sea Island. It is one of those golden isles in that necklace of islets off the coast of Georgia, where the weather is always bland and soft and the ocean never gets cold, and the fish simply beg you to catch them, and the game dares you

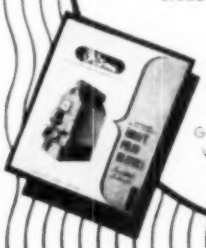


Control panel box

. . . . . Dust tight, damp proof panel box is located on front of heater within sight and reach of all burner adjustments. Thermostatic and safety controls operate on 110 volt current from transformer in control box.

Olson

ARTHUR A. OLSON & COMPANY
Broad Street, Canfield, Ohio



DIRECT FIRED HEATERS
Gas, Oil, Coal
or Dual Gas and Oil

Get the inside story
Write for catalog
No. F50HL

IF THE POSTMAN DIDN'T BRING YOU ONE OF THESE

THIS ENVELOPE CONTAINS YOUR COPY OF

The magazine which will help you get more Terne Roof Business. It is sent to you with the compliments of

FOLLANSBEE STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

Send Coupon today

Terne Topics is published to help you get more of that profitable metal roofing business with Follansbee Seamless Terne Roll Roofing.

You'll want a copy of this first issue of Terne Topics . . . and you'll want your personal copy of every issue to follow. This coupon puts you on the mailing list.

FOLLANSBEE STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH 30, PA.
COLD ROLLED STRIP • ELECTRICAL SHEETS • POLISHED BLUE SHEETS
SEAMLESS TERNE ROLL ROOFING

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle, Toronto and Montreal, Canada.
Plants—Follansbee, W. Va.
FOLLANSBEE METAL WAREHOUSES
Pittsburgh, Pa. • Rochester, N. Y. • Fairfield, Conn.

Editor, Terne Topics, Dept. AA
Follansbee Steel Corporation
Pittsburgh 30, Pennsylvania

Put me on the Terne Topics Mailing List!

Name _____

Firm Name _____

Address _____

LOOK here for answers

to Tomorrow's NEW Problems

Now that priorities, allocations, cut-backs, and other essential restrictions have returned to the industrial scene, the heating, ventilating, and air conditioning picture is certain to undergo significant changes in the days to come — to pose new problems for contractors; distributors, dealers; and consulting, design and sales engineers associated with these fields. That is why attendance at this foremost Exposition of its kind — largest ever staged — takes on greater importance and timeliness than ever. The wealth of first-hand information available here on latest developments, newest trends, available equipment and supplies, and sources of supply, may prove to be an invaluable business asset for the uncertain times ahead. Over 300 exhibitors with their technical representatives will be on hand to show and tell what the future offers for heating, ventilating and air conditioning in all types of commercial and public buildings, industrial plants, and homes. In no other way can so many helpful ideas and valuable contacts be obtained, and so much equipment seen and compared in so little time . . . all so essential to solving tomorrow's new problems.

So plan now to take advantage of this big opportunity. Note the dates.

Auspices of the American Society of Heating & Ventilating Engineers

Management International Exposition Company

to shoot. Some time ago some of the wealthiest people in the world, with all the leisure in life, hired experts to find for them the most ideal spot for secluded retreats. These explorers poked into all corners of the world and finally reported that Jekyl Island, one of this Georgia chain, was the ultimate dream.

It was in this setting that the all-highest of government personnel recently met with the all-highest of American industry. The Business Advisory Council is an extremely interesting organization about which most Americans know absolutely nothing and the average businessman has only a faint idea. Its gatherings usually occur in secluded places. In effect, the council is a permanent organization of the elder statesmen of the American economy. It is a sort of permanent council to the Federal government.

Its members are not chosen because they represent a specific constituency of business, but because they have extraordinary personal qualities, are known for distinguished business abilities of the highest order, and tower internationally as well as nationally over the economic world. The active members number 62. Those who are called the graduate members total 92. Each year, fifteen who have served the longest among the current active members retire and become graduate members. Thus this virtually self-perpetuating organism annually gives itself a blood transfusion by carefully choosing 15 new members. The active members carry the burden of all the work. They pay their own expenses and probably pay most of the incidental expenses. Graduate members participate more or less at their own discretion. But there is scarcely an important meeting which they fail to attend. There is a distinction and a notable importance about the sessions of the council that is its own attraction.

This organization came into existence during the distressing days of 1933. It was a very important, though little known, inner-core mechanism during World War II. It probably has done more to crystallize important thought about the most important subjects in the relation of the economy to the political and social life of the nation than any other single unit in the country. Those who do the thinking and formulate the thinking into conclusions that lead to action are those who conduct the basic industries and services of the nation. To belong to the Business Advisory Council of the Department of Commerce is to the businessman something like belonging to the Phi Beta Kappa is to the men from the colleges. It is the ultimate selective honor. The names on its membership list reads like Who's Who of American economy. The list includes John L. Collyer, B. F. Goodrich Co.; Benjamin F. Fairless, United States Steel Corp.; Henry Ford, Ford Motor Co.; Paul G. Hoffman; John Holmes, Swift and Co.; John L. McCaffrey, International Harvester Co.; Philip D. Reed, General Electric Co.; C. R. Smith, American Airlines; Charles E. Wilson, General Motors Corp.; General William Henry Harrison, International Telephone and Telegraph Corp.; Austin S.

Manufacturers' Agents

Are you interested in securing additional lines?

We are occasionally asked by our manufacturer advertisers to suggest the names of manufacturers' agents in various sections of the country whom they can contact in regard to representation of their warm air heating, residential air conditioning and sheet metal products.

If you would like your name listed on our records for inquiries we may receive on your territory, we invite you to write us. There is no charge in connection with this service.

American Artisan

6 N. Michigan Ave. Chicago 2, Ill.

classified advertising...

Is the quick, economical way to find what you're looking for. Check the classified page each and every issue for real bargains and hard-to-find items. It's a quick and sensible means too, of disposing of tools, equipment or anything else for which you no longer have use. Check the classified pages for rates.

AMERICAN ARTISAN

6 No. Michigan Ave.
Chicago 2, Illinois

Furnace Buyers

Are you getting all the furnaces you need, when you need them?

Immediate Delivery

We have in stock all sizes of round cased gravity furnaces, forced air gas fired, oil fired and coal fired from 75,000 BTU to 325,000 BTU.

Three week delivery on Mammoth furnaces rated up to 1,750,000 BTU.

Let us know your requirements. Wire, write or phone.

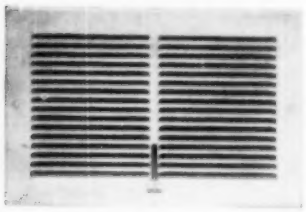
A Few Territories Open

Write for complete details on discounts and distribution plan of one of America's finest line of furnaces.

CERTIFIED FURNACE CO.

1000 Berry Ave. St. Paul 4, Minn.

SAVE TIME
By Using



AND WATCH YOUR PROFITS INCREASE

Here's A Single Valve Register with the Valve Hinged at the BOTTOM!! For use in Basementless Homes where the Conductor is Dropped from above the Register. Ask your Supplier, or Write:

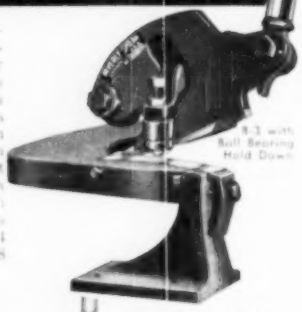
THE A & A REGISTER CO.

8327 Clinton Rd. **Cleveland, Ohio**

Geo. G. Auer, Pres.

BEVERLY SHEARS SAVE TIME · LABOR · MATERIAL

Make any cut—curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models—capacities 18 gauge to 3/16" mild.

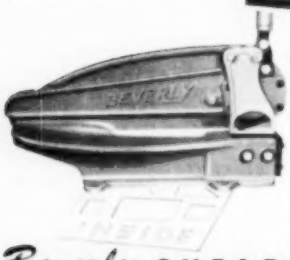


R-3 with Ball Bearing Hold Down

INSIDE SLOTTER

8" Reach—16 ga. capacity

Makes inside lettings cutting faster, easier, cleaner. Punch and die arrangement or 3 blades assures accurate, clean cutting action. Cuts 2½" x 1/4" or 2½" x 3/16" slot at one stroke. Throat design permits pinning work at any point in stroke for special inside cuts. Note sample cuts at left.



See your Beverly Dealer or write for illustrated catalog

Beverly **SHEAR MFG. CO.**

3020 W. 111TH STREET • CHICAGO 43, ILLINOIS

Iglehcart, General Foods Corp.; Winthrop W. Aldrich, Chase National Bank; Hiland G. Batcheller, Allegheny Ludlum Steel Corp.; Dr. Vannevar Bush, Carnegie Institution; Cyrus S. Ching, Federal Mediation and Conciliation Service; R. R. Deupree, Proctor and Gamble Co.; Senator Ralph E. Flanders; Clarence Francis, General Foods Corp.; Ambassador to Persia, Henry F. Grady; Ambassador W. A. Harriman, banker and assistant to the President; Thomas S. Holden, F. W. Dodge Corp.; Charles R. Hook, Armco Steel Corp.; Paul W. Litchfield, Goodyear Tire and Rubber Co.; Chancellor Dean W. Malott, University of Kansas; Juan T. Trippe, Pan American Airways System; Thomas J. Watson, International Business Machines Corp.; A. D. Whiteside, Dun and Bradstreet Co.; C. E. Wilson, General Electric Co.; John W. Snyder, Secretary of the Treasury; Roland J. Hamilton, American Radiator and Standard Sanitary Corp.; W. S. S. Rodgers, the Texas Co. and others.

The Business Advisory Council has permanent offices and a permanently functioning staff in the Department of Commerce building. Anyone who is interested will probably be able to get any proper cooperation at the Washington office. It is a curious fact that the council seldom appears in the news and that it holds its important meetings in secluded and relatively remote places without benefit of public notice and public relations. It functions as unobtrusively as the conspicuity of its members permits. There is no doubt, however, that the meetings of the council have had a far reaching effect upon the nation and that its activities have acted as a balance wheel to many projects of the government. The council, without question, will have a great deal to do with molding policies and practices involved in Marshall's four year plan. There is considerable comfort in knowing that a body of such solid substance and unusual attributes really is part of the permanent government of the United States.

Wadsworth—

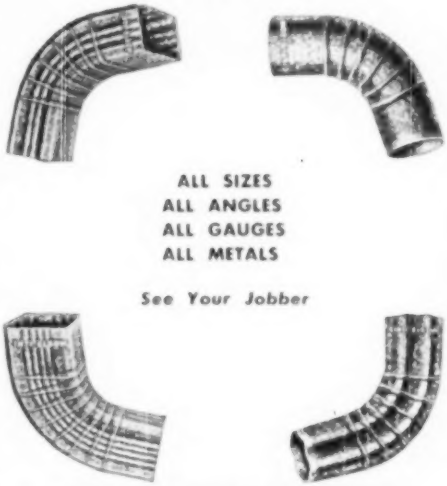
(From page 77)

serviceman can check conditions against results on the balance sheet and determine where the trouble lies.

The various procedures which have been outlined in this article may take more time than you think should be spent. However, if you follow the entire procedure at first, shortcuts will become apparent as you become more familiar with the method. Each problem that you encounter and solve is another addition to your store of knowledge. The next time the same problem arises, a solution will be at hand. Perhaps the most important tool to possess for balancing a heating system that is causing complaints is an open mind. If the serviceman will approach the job with no preconceived notions about what is wrong with it, he will make rapid progress when he begins his investigation. Take nothing for granted. Check every phase of the troublesome system and you are sure to get the right answer.

THE CINCINNATI ELBOW COMPANY

2021 Eastern Ave.
CINCINNATI 2, OHIO



ALL SIZES
ALL ANGLES
ALL GAUGES
ALL METALS

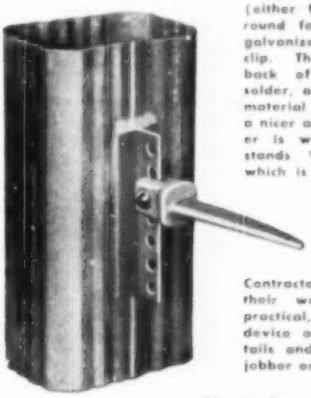
See Your Jobber

CONDUCTOR PIPE ELBOWS and SHOES

F & F CONDUCTOR FASTENERS

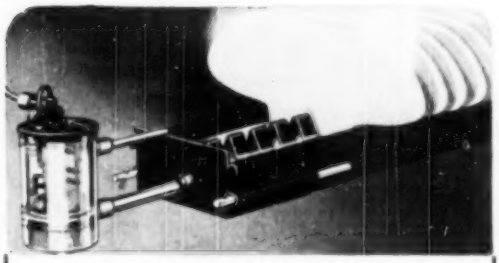
GIVE YOU A BETTER JOB!

F & F takes less time to put in, makes a more secure and permanent installation. Cadmium plated malleable iron drive (either flat shape for brick or round for wood) is bolted to galvanized or copper perforated clip. This clip is soldered to back of conductor. Easy to solder, as clip is made of same material as conductor. You get a nicer appearing job — fastener is wholly concealed. Pipe stands 1/2" away from wall, which is preferable.



Contractors who take pride in their work like to use this practical, durable, inexpensive device on their jobs. For details and list prices write your jobber or us.

Made by
FRANCK & FRIC
7109 Kinsman Road Cleveland 4, Ohio



We Have THE Complete Line
of Humidifiers
for Warm Air,
Air Conditioning, or Steam Heat!

Monmouth Flotrol Humidifiers— For average and larger air conditioning and forced air jobs, the last word in reliability and super service.
Monmouth Micro-Feed Humidifiers— The simplest, most dependable drip-feed unit adaptable to a wide range of jobs. Low in cost, but well built and accurate in performance.
Monmouth Flotrol "310" Small Humidifiers— A true Monmouth quality product, designed for small furnaces. Up to 100,000 BTU's and very economically priced. Easy to install. Includes all necessary parts.
Monmouth Humidity Conditioners— A self-contained, gas fired, independently operating unit, engineered for use with any radiator heating system. Controls are synchronized with the heating plant.

For the BEST in humidifiers—for any purpose—consult the experts—Cleveland Humidifier.

THE CLEVELAND HUMIDIFER CO.
7802 Wade Park Ave. Cleveland 3, Ohio

MONMOUTH HUMIDIFIERS

SIMPLIFY YOUR BUYING!

You can save TIME by combining your orders for Conductor Pipe, Gutter, and Accessories with your orders for Galvanized Pipe, Fittings, Registers, and Cast Iron Furnace and Boiler Repairs.

ACT NOW! Your ordering will be easier, faster, and more economical when you buy in one large order

from

Iowa's Largest Heating Wholesaler

DES MOINES FURNACE AND STOVE REPAIR CO.
Des Moines, Iowa

A Complete Selection

For coal, gas or oil
forced air or gravity

BOOMER cast iron
and
STARK steel
FURNACES

Write for information about an exclusive sales territory.

THE HESS-SNYDER CO.

MASSILLON, OHIO

MANUFACTURERS OF QUALITY FURNACES SINCE 1880

WHITNEY METAL
TOOL COMPANY
39 YEARS EXPERIENCE

WHITNEY-JENSEN
Nos. 42 and 44 SEAMERS
No. 141 NOTCHER

No. 42 . . . Small seamer that handles heavy sauce material easily. Jaws 1-3/4" wide, length overall 5-1/2", weight 1-1/4 lbs.
No. 44 . . . Handy tool for light work. Jaws 3-1/2" wide, length overall 8", weight 1 lb.
No. 141 . . . Hook design of jaw permits notching to exact depth without slippage. Easy to operate, spring return jaws. Length overall 9", weight 1 lb.

WHITNEY METAL TOOL COMPANY
91 FORBES STREET, ROCKFORD, ILLINOIS

Accounting—

(From page 60)

Some businessmen do not believe that control of payables is needed because they pay as invoices become due. If the *Indoor Comfort* contractor operates on a strictly cash basis it is true that at any one moment his liabilities may be few and of nominal amount. However, for those who purchase on terms such as 2 per cent/10 days, and net 30/days it is very important that rigid control over payables be maintained.

All businessmen recognize that savings can be made if available cash discounts are taken. This requires that invoices be processed for payment before expiration of the discount period. For small firms, use of a tickler file is suggested. A small file box will suffice. File divisions are set up, one division for each day in the month. If an invoice is dated the fifth day of the month and the discount period is ten days, payment must be made by the fifteenth to take advantage of the discount.

After preparation of the voucher check, the invoice should be stamped with check number and date on which it was paid. The invoice is then removed from the tickler file and put into a paid file. This procedure will do much to insure prompt payment and available cash discounts. Another advantage of such a system is the ease with which total current liabilities may be quickly reviewed and totaled. It is only necessary to total the invoices found in the tickler file to find total current liabilities on any specific date.

Mr. George believes that even the *Indoor Comfort* dealer with a small business volume should have a public accountant audit and check the books. He says:

"The practicing certified public accountant can be of great service to all business, large or small. Some businessmen have come to realize, through past experience, the importance of the professional accountant's services over and above accounting activities. The widespread idea that public accountants are interested mainly in serving big business is a mistaken one. There are, of course, large firms of public accountants whose organizations are more suited to the needs of big business, but there are many small firms and individual practitioners who are fully qualified and *ready* to be of help to the small business."

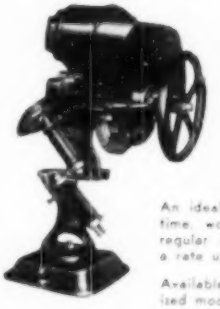
What about the tools of accounting—the forms and systems which *Indoor Comfort* dealers use to carry out their accounting and bookkeeping objectives?

Simplicity, should be the first consideration. Present needs should be met. Flexibility is also important so that future expansion can be handled. A new system should not provide an extensive account classification for the far distant future, when a simpler and less detailed one will facilitate routine operations now. The system must be adequate but not cumbersome.

Quite often, more accountants are actually needed than appear to be necessary to the dealer who is inexperienced in accounting principles. The certified public

★ STEP UP PROFITS with

MARSHALLTOWN



ROTARY
THROATLESS
SHEARS
★ cuts any
size -- shape

An ideal profit maker, this shear saves time, work on every job. It does irregular cutting or straight splitting at a rate up to 6 feet per minute.

Available in hand operated or motorized models. Prompt shipment.

• SEND TODAY FOR ILLUSTRATED BULLETIN

MARSHALLTOWN MFG. CO.

950 E. Nevada Street — Marshalltown, Iowa

CLEAN EVERY TYPE of FURNACE

with a

GRAND RAPIDS *de luxe* FURNACE CLEANER

Large air volume and high velocity give the Grand Rapids Furnace Cleaner maximum recovery capacity. This means faster, more efficient cleaning for every type of furnace or boiler . . . plus more jobs and larger profits for you. Standard groups of attachments available with each Furnace Cleaner are designed to reach into and clean every part of the heating plant.

Service your furnace cleaning jobs with a Grand Rapids DeLuxe Furnace Cleaner. It is sturdy, long wearing and constructed to do a thorough cleaning job under the roughest conditions. Write today for information.

DOYLE VACUUM CLEANER CO.

227 Stevens St., S.W. — Grand Rapids 7, Michigan

ANCHOR AIRE

The Big Name In Winter Air Conditioner Is . . .

DUO-BILT
FOR GAS OR OIL

Lo-Boy

This Anchor Winter Air Conditioner operates equally well as a Gas or Oil Furnace.

Anchor makes a COMPLETE Line of winter air conditioners to consume pressure oil or vaporizing oil, natural, manufactured or L.P. Gas. Forced air and gravity types are available in sizes and capacities to fill virtually every residential heating need.

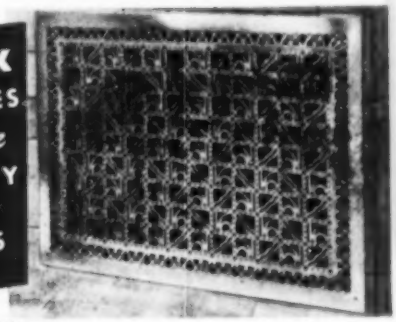
The Anchor "Fuel Saver" heating element provides for long, indirect heat travel and large heating surface.

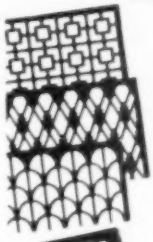
Both the Winter Air Conditioners and the Gravity Circulating furnaces are encased in attractive, eye-appealing cabinets making these units "at home" in the most modern basement or utility room.

Write today for detailed literature and prices.

ANCHOR DIVISION, STRATTON & TERSTEGGE CO., INC.
P.O. BOX 311, NEW ALBANY, IND.

H & K GRILLES *Insure* BEAUTY for YEARS





Our new grille catalog No. 33 sent upon request

Complete concealment, yet ample open area for proper air circulation. Grilles for heating and air conditioning systems with damper controls if required.

A wide range of grille patterns from which to choose. Fabricated in stainless, bronze, aluminum or steel and furnished with care and precision.

Quality of workmanship insures the lasting beauty of H & K ornamental grilles.

Send us your specifications so we may quote on your requirements of grilles and registers.

Harrington & King Perforating Co.

5649 Fillmore St., Chicago 44, Ill.
114 Liberty St., New York 6, N. Y.

Picture of Profits!

Of course, our fittings are fabricated with extreme care and delivered to you with a minimum of delay and when they are "Made-Rite" you know the job will be well done.

We are ready and anxious to deal with you and you'll be pleasantly surprised at the completeness of our line and dependability of our service.

We solicit inquiries on slitting of metal up to 40 inches wide and 14 gauge and lighter.

"Made-Rite" Co., Inc.

10th and Monroe St. Newport, Ky.

accountant will study over-all requirements of the business, both present and future. This service will also incorporate the accountant's recommendations for types of forms to be used in the business as well as the forms to be used in journals and ledgers.

Some *Indoor Comfort* dealers still use systems which were established many years ago and which are now obsolete. Principles of business operation change periodically. By the same token, accounting requirements change. Adjustment to meet new needs is advisable from the standpoint of efficiency and economy. Expense of gathering and analyzing useless information should be avoided. And needed information not now being gathered should be included in the accounting program.

Reid-Pattern Development

(From page 39)

e) From point R' on line RS as center draw a 90 deg arc and tangent to the arc draw a line $3\frac{1}{4}$ in. long intersecting line RT at T.

f) The length of metal required to stretch around the throat of the elbow is calculated by multiplying the radius by 1.57 thus: .75 x 1.57 = $1\frac{1}{8}$ in.

g) From line RS measure off $1\frac{1}{8}$ in. plus the added straight length which is $\frac{1}{4}$ in. as shown on the front view drawing.

h) Add allowances for joints, Pittsburgh lock seams, and form to required shape.

To lay out pattern C:

a) Draw the line HK and locate the given radii $3\frac{1}{4}$ in. and $1\frac{1}{8}$ in. as shown on front view.

b) From points H and J as centers draw 90 deg arcs $3\frac{1}{4}$ in. radius and $1\frac{1}{8}$ in. radius respectively and letter W and X as shown.

c) From point W extend a line $\frac{1}{4}$ in. and from point X extend a line $\frac{7}{8}$ in. as indicated by $W'X'$. Draw a line connecting points $W'X'$.

d) The length of metal required to stretch around the back of the elbow is calculated by multiplying radius 1 in. x 1.57.

e) From line HK measure distance 1 9/16 in. plus the added straight length which is $\frac{3}{4}$ in. as shown on the end view drawing.

f) Add allowances for joints, Pittsburgh lock seams and form to required shape.

To lay out pattern D:

a) Draw the line LM and locate the given radii points $3\frac{1}{4}$ in. and $1\frac{1}{8}$ in. as shown on front view.

b) From points L and M as centers draw 90 deg arcs $3\frac{1}{4}$ in. radius and $1\frac{1}{8}$ in. radius respectively. And letter X and Y as shown.

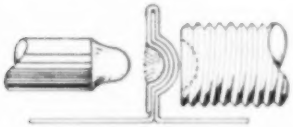
c) From points X and Y extend lines $\frac{1}{4}$ in. and $\frac{7}{8}$ in. in length and letter Y' and Z'. Connect points $Y'Z'$.

d) The length of metal required to stretch around the

WHITNEY LEVER PUNCHES

No. 6 Punch

This Tool is especially adapted for Button Punching or for Templet work. Punch will strip where handle cannot be opened to 90 degrees.



These punches are often called Tip Punches, and are used to fasten standing seams without making a hole, by simply indenting the three thicknesses of metal.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

Insist on Angle Rings that are rolled correctly to your specification and avoid trouble and delays. All Rings correctly made to size—with a true circle and 90° angle. Furnished with or without holes. Write for list of stock sizes and discounts.

NATIONAL METAL FABRICATORS
2140 S. Sawyer Avenue — Chicago 23, Ill.

Midco Register Corp.
1059 Grand Ave.
St. Paul, Minn.

GET IT FROM YOUR JOBBER

Registers — Grilles — Floor Faces — Floor Registers — Gravity Registers. The complete quality line for all winter and summer air conditioning.

BUYERS' GUIDE
for America's Quality Line

ATH-A-NOR

biggest **SUCCESS** ever!

- Ath-A-Nor is the greatest money making furnace a dealer can buy because it costs less and because it has more exclusive selling features including the famous Ath-A-Nor Air Blast. Write for franchise details.

Coal Gas & Oil Furnaces & Parts
MAY-FIEBEGER COMPANY
MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS
Newark Ohio

NEW STANDFORATED

"BEND-EZY"

FORCED AIR REGISTERS and GRILLES

Smartly Styled . . . Efficiently Designed for Sidewall and Baseboard Installations

The Standforated "Bend-Ezy" sidewall registers are stamped from sheet metal and have horizontal bendable bars, set at time of fabrication for 30 degree downward deflection. Each bar can be easily readjusted with a "Bend-Ezy" tool to any angle for upward, downward or straight flow.

Illustrates how easy it is to set the bars with a "Bend-Ezy" tool. SINGLE DAMPER REGISTERS with bendable bars

Write for NEW Catalogue—
Contains complete information—fully illustrated

- FLOOR REGISTERS. One-piece frame construction.
- GRAVITY BASEBOARD REGISTERS
- COLD AIR FACES
- PERFORATED METALS FOR EVERY INDUSTRIAL USE

PROMPT DELIVERIES

STANDARD STAMPING & PERFORATING CO.
3137 W. 49th PLACE • CHICAGO, ILLINOIS

. . . keeps Western Rotary Turbine Ventilators in operation, providing constant 'round-the-clock exhaust. Western's lifetime-guaranteed bearings are both mounted on the same axis . . . always stay in alignment . . . stand up to shipping jolts. Throat sizes from 6" through 48". The typical, clean, attractive silhouette that progressive industry demands. Western turbo-ventilation . . . high in efficiency, low in cost.

Request our catalogue for information, sizes, capacities, price lists. In 1950 Sweets and A. E. C. jobbers are invited to participate in our national sales system.

"Always on the job—never on the payroll"

WESTERN ENGINEERING & MFG. CO.
1726-28 S. WASHINGTON BLVD., LOS ANGELES 21, CALIF.

throat of the elbow is calculated by multiplying radius $1\frac{1}{2}$ by 1.57.

e) From line *LM* measure distance 13.16 in.

f) Add allowances for joints, Pittsburgh lock seams and roll to required shape.

Warm Air Preference—

(*From page 82*)

Fourth Quarter, 1949

Total starts		5,430
Conventional warm air (ductwork)	4,460	82
Hot water	770	14
Panel	190	4

A change from one quarter to the next was also noted in the Pittsburgh, Penn., area. During the third quarter of 1949 the typical house was a brick veneer, detached home of 2 stories with 6 rooms. The 6 room house averaged 1,150 sq ft in floor area.

A trend toward economy became evident in the last quarter of the year. The typical house became a 1 story detached unit of brick veneer with 5 rooms. This average house provided 940 sq ft of floor area.

Nearly all the houses in this area had basements and the greatest percentage had garages.

Pittsburgh, Penn. — Third Quarter, 1949

Total starts		1,880
Heating systems	No.	%
Conventional warm air (ductwork)	1,530	81
Hot water	270	14

Fourth Quarter, 1949

Total starts		1,640
Conventional warm air (ductwork)	1,430	87
Panel	200	12

As in the case of Los Angeles, the type of house to be found in San Francisco reflected the nature of the climate, insofar as heating systems were concerned. The typical house in the San Francisco-Oakland area started in the third quarter, 1949 was a 1 story, detached unit, had 5 rooms and approximately 1,000 sq ft of floor space. Construction was most often frame, with wood or stucco exterior. It had a single bathroom, a one car garage, a fireplace, but no basement or utility room.

San Francisco-Oakland — Third Quarter, 1949

Total starts		3,980
Heating systems	No.	%
Conventional warm air (ductwork)	740	19
Floor or wall furnace	3,200	80

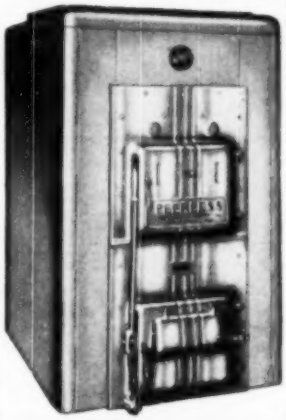
(Panel heating found in a few houses)

The territory around Washington, D. C., showed a preference for the economy sized 1 story house during the third quarter of 1949. Here the typical house was a detached 1 story 5 room unit built of brick. Floor area in most of these 1 story homes was 1,000 sq ft or less. Basements were found in 52 per cent of the homes.

Washington, D. C. — Third Quarter, 1949

Total starts	3,190

It's New and Different
PEERLESS
All Steel FURNACE



PEERLESS compact square cased gravity furnace, for all fuels, meets and beats all competition.

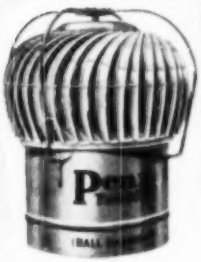
This model is only one of the many in the greatest line of furnaces this old reliable company has ever had the pleasure of offering to the trade.

Sell every prospect — Peerless offers you a complete line of all-steel warm air heating equipment for OIL, GAS, or COAL. Write today for new literature.

PEERLESS FOUNDRY COMPANY
INDIANAPOLIS 7, INDIANA

Order from your Jobber

M. A. GERETT CORP.
MILWAUKEE 5, WISCONSIN



NO PROBLEM WITH PENN

For most efficient ventilation in all types of buildings — wise contractors buy Penn Ventilators — the true rotary, air-drive suction turbine that works automatically, continuously, silently without maintenance or operating expense.

Used extensively throughout the world, Penn Turbine Ventilators can solve your ventilating problems — quickly, efficiently, economically.

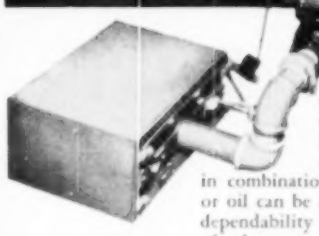
YOUR LOCAL JOBBER STOCKS PENN VENTILATORS IN ALL SIZES

JOBBERS: WRITE FOR PROFITABLE DISTRIBUTORS' SET-UP

PENN VENTILATING CO.
ALLEGHENY AND GOODMAN
PHILADELPHIA 40, PENNSYLVANIA

Free Literature Upon Request

A "Double Feature" BURNER



The Siemon Gas Burner is an extremely efficient heavy duty burner, which can be installed as a straight gas burner or in combination with an oil burner, or oil can be added later. Maximum dependability and economy — completely automatic.

Siemon Combi-Matic BURNER
COMBINES OIL WITH GAS

NEW CONVERSION BURNER

A conversion burner with many new features at an economical price offering maximum efficiency.

WRITE FOR LITERATURE AND DETAILS

SIEMON & CO., 1819 Holmes St., Kansas City, Mo.

. . . minutes mean
money — you'll save them
on installations because

YOUNGSTOWN FITTINGS **FIT!**

We don't have to tell you that minutes lost on jobs add up to hours of overtime at the end of the month. It's a simple fact that fittings which have to be cut and juggled eat in to your profits, so it's foolish to use them. Concentrate on Youngstown's . . . . save those minutes of installation time, they'll leave you free to look up more profitable jobs.

If you're not now one of our satisfied customers . . . . contact your jobber today. He'll supply you with genuine Youngstown's and you'll see the difference for yourself.

. . . remember

YOUNGSTOWN FITTINGS **FIT!**

YOUNGSTOWN FURNACE CO.

627 Marshall Street — Youngstown, Ohio

NEW! IMPROVED!
1951 MODEL TRI-SAW

ALL-PURPOSE
PORTABLE POWER HACKSAW

Only the sensational new time and work saving Tri-Saw gives you all these advantages:

- Makes any cutting job easier . . . quick . . . economical
- Cuts most anything . . . anywhere . . . wood, sheet metal, heavy metal, nails, pipe, etc.
- Cuts directly into floors and walls without starting hole
- Fits any heavy duty 1/4" or 5/16" drill

SPECIAL TRADE-IN OFFER!
(limited time only)
Trade your used Tri-Saw for new 1951 model. Extra savings! For details see your jobber or write—

TRI-SAW CORPORATION
St. Louis 17, Missouri
Distributed nationally by
E. R. PRINCETON & ASSOCIATES
2456 W. Diversey Blvd. • Chicago 47, Illinois

Heating systems	No.	%
Conventional warm air (ductwork)	3,020	95
Hot water	70	2
Remainder:		
Steam		
Panel		

It will be noted that there is some variation in the nature of the reporting from city to city. Part of this is due to varying conditions brought about by differences in climate. Another factor that enters into the survey is that all the regional offices of the Bureau of Labor Statistics have not used identical standards in drawing up their reports of characteristics. It is possible that further experience with this survey will bring about a uniformity, so that the same conditions will be reported from each area and parallels can be drawn.

In the figures reported from each metropolitan area there will be some variation between housing starts and the heating system breakdown. This is generally due to inability of those making the survey to get complete information on each house started in the period surveyed.

The increasing importance of panel heating may make it possible to get a more accurate division of the panel systems which use warm air and those which use hot water as the heating medium.

Most obvious conclusion to be drawn from the figures cited in this survey is the marked consumer preference for warm air in almost every heating market where central heating is an essential part of winter comfort. Further proof is thus given that *Indoor Comfort* is what the public wants and that warm air heating will provide it.

Die Design—

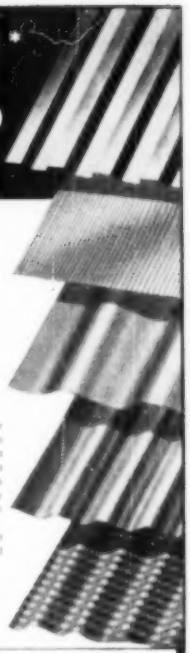
(From page 95)

and templets which are required to guide production. Sheet metal workers make the templets and produce the sample or trial pieces. Only after hand made models have been accepted is production started on the dies which are to turn out great numbers of stampings.

While the automobile industry has been used as an example in this description of die design, the system is not restricted to high volume enterprises. The method can be used in a small sheet metal shop which is going to turn out ammunition boxes or canteens or any sheet metal product. Use of high speed presses and dies can be justified on a dollars and cents basis. When many units are to be made, the cost of the dies is quickly offset by the low cost per unit brought about by the use of a high speed press.

Forming dies can also be made of hardwood, masonite and other easily worked materials. Kirksite dies can be used in large presses. Wood and masonite dies can be used to advantage in hydro-presses, press brakes, and smaller stamping or forming presses.

LUSTRIK* ALUMILITED SHEETS



Processed metal for a streamlined effect in sheet metal work

- SIGNS & LETTERS
- FACIAS
- ENTRANCES
- SOFFITS
- DOOR FRAMES
- SPANDRELS
- DOOR COVERINGS
- BULKHEADS

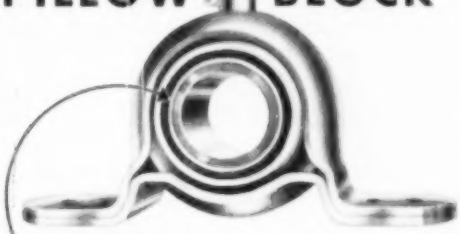
Lustrik* Alumilited aluminum sheets have the stand-out features that appeal to every "sheet metal man." Here's a treated sheet that can be formed on a brake and cut with ease. Large panels save time — quickly and inexpensively erected. Ideal for the modern effect on stores, factories, service stations, etc. Available in flat, square streamlined, rib fluted, corrugated and cross crimped corrugated.

*Reg. T.M.

WRITE for free sample kit and information

PHILADELPHIA RUST PROOF CO.
3225 Frankford Ave., Phila. 34, Pa.

TRIANGLE PILLOW BLOCK



SHOCK-ABSORBING BUILT-IN CUSHIONS

- For fans, blowers and other devices requiring self lubrication—perfect alignment—silent operation.
- Two piece solids built-in, non-hardening cushions. It's all in the ball—no extra parts to buy or handle!
- Special Mountings Designed To Meet Specific Needs

Triangle Bridge-Tree Type Pillow Block

TRIANGLE MANUFACTURING COMPANY
392 DIVISION ST. OSHKOSH, WIS.

SALES EXECUTIVE WANTED

A ONCE IN A LIFETIME OPPORTUNITY

COROAIRE . . . acknowledged by heating experts, engineers, and authorities as the most outstanding achievement and industry advance in this field during the past 50 years, is seeking a Senior sales organizer with a proven record of promotional selling experience to take full charge of the heating and building sales division.

For the ingenious, resourceful, and imaginative sales executive, we offer a most unusual opportunity with earning possibilities of better than $20,000 per year.

COROAIRE patents, exclusive features, unchallenged record of operational efficiency and economy is a sales dream for every progressive heating jobber, contractor, heating dealer, architect, and builder — sales of better than $50,000,000.00 since the war conclusive proof.

Almost unlimited production and engineering facilities, available raw material resources.

Progressive, sales-minded, cooperating management.

Qualifications — self-starter — proven ability to organize national field sales force — record of establishment and sales to distributors, jobbers, heating dealers, contractors, and new construction field — able to travel extensively — excellent health — trade following — unimpeachable personal character and business references.

To the individual meeting these qualifications and proof, a once-in-a-lifetime opportunity. Give brief history in reply. All information held confidential until after personal interview. Address all replies to the attention of the president.

THE COROAIRE HEATER CORPORATION
1422 Euclid Ave., CLEVELAND 15, OHIO

Make Your *Best* Job *Better*..

VISE-GRIP Sheet Metal Tool

LOCKS to work with a tremendous grip! squeezing like ordinary tools—just close your hand for Ton-Grip. Easily released or adjusted to non-locking action. Speeds up every job—makes your best jobs even better!

"Handiest tool I ever used!" say thousands. Better than any other for bending, forming, seaming and straightening sheet metal—holding sheet metal for soldering, working inside stacks, etc. Extra deep throat up to 1-¾ in.

No. 8, 8-inch $2.95

Order from your supplier.

Manufactured Only By

PETERSEN VISE GRIP MFG. CO. INC.

Dept. AA-12 DeWitt, Nebr.

BRAUER has

REPAIR PARTS for all FURNACES BOILERS, STOVES • *Guaranteed to* FIT

A. G. BRAUER Supply Co.

2100 Washington Ave. St. Louis, Mo.

Heating Sheet Metal

FRANK X ENDERLE

Air Conditioning Supplies

Furnace pipe, adjustable elbows and Fittings

ALSO: Complete line sheet metal hand tools

Frank X Enderle, Inc., Ltd.

1600-1700 San Fernando Road, Los Angeles 41, Cal.

Sheet Metal Machinery
•
Pittsburgh Lock Machines
•
Stovepipe and Elbow Machines
•
Roll Forming Machinery and Dies
•

Maplewood Machinery Co.

2634 Fullerton Avenue
Chicago, Ill.

ADAMS

Flue Thimble

(Cast Iron)

Sizes from 6 to 12 inches

Buy Adams Known Quality

THE ADAMS COMPANY

Bridge Street • Established 1883 • Dubuque, Iowa

Welding—

(*From page 100*)

oxide in a crucible. When the mass is ignited, the aluminum takes the oxygen away from the iron oxide and yields a mixture of steel and aluminum oxide. The iron is allowed to flow from the crucible to the joint of the steel rails. The intense heat raises the rails to the melting point and fuses to the molten iron thus producing an autogenous weld.

The thermit process is also used for repairing large sized castings and forgings which cannot be welded by either oxy-acetylene or electric arc methods in a practical, economic manner. It is really a casting process in which two pieces of metal are held in the mold and the casting made around the joint, at the same time, fusing the two pieces together with molten metal to form one homogenous piece.

News Round-Up—

(*From page 52*)

October 10th, passed a unanimous resolution of gratitude and personal affection for Curtin's long years of valuable service. A pension arrangement was also approved.

Managing Director Becker was elected to the office of secretary-treasurer.

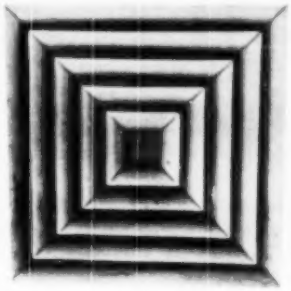
NLRB Jurisdiction

FOR THE FIRST TIME in its history the National Labor Relations Board has declared a set of standards for determining whether or not it will assert jurisdiction in cases involving so-called local business. One of the major problems in the past has been the uncertainty about whether the board would assert jurisdiction in a labor dispute.

According to the legislation which set it up, the board has power to take certain action for the purpose of preventing unfair labor practices affecting commerce. The courts have interpreted the term "affecting commerce" very broadly and the board has actually intervened in cases that would seem to have slight effect on interstate commerce. To clarify this situation a set of standards has been issued which provides a test as to whether the dispute does affect commerce and the board should intervene.

The board will take jurisdiction in cases involving the following businesses:

1) Enterprises that annually buy or sell outside the state, or furnish to interstate users, a specified dollar volume of goods or services.
2) The following enterprises, irrespective of the dollar volume of their interstate purchases and sales:
   a) instrumentalities and channels of interstate and foreign commerce,
   b) public utility and transit systems,
   c) establishments operating as integral parts of multi-state enterprises,



AIRFAN *for accuracy*

Certainly! All AIRFAN units are designed and tested under actual conditions to be sure there will be no call-backs due to equipment failure. Write us for more complete information.

« « AIRFAN Four-way Diffuser. Draftless, noiseless, beautiful, low in cost, they will provide better air distribution for high velocity outlets, with a minimum of resistance to air flow. Air is distributed slightly below horizontal ceiling thereby keeping ceiling clean.

At right is the AIRFAN » » Air cooler — 2000 to 12000 CFM series. Correctly designed so maximum air at least resistance can flow through louvered grilles with minimum horsepower. Pans die drawn of one-piece special steel. Heavier gauge material than found in any other make.

AIRFAN ENGINEERING CO.

7403 ANAHEIM-TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

Designed Primarily for Residential Heat Loss Calculation

CLIMATEMAKER HEAT LOSS CALCULATING **SLIDE RULE**

Gives the RIGHT Answers QUICKLY to:

★ B.T.U. heat loss per room. ★ C.F.M. required per room. ★ Pipe area, pipe and stack size for forced or gravity warm air heating. ★ E.D.R. of steam and hot water. ★ Blower size. ★ Figures outside design temperatures from 40 Below to 40 Above zero. Designs based on zero to 70°. **Write Dept. AA-12**

Easy to learn—Simple to use. ORDER NOW—

Copyrighted in U.S.A. and Canada. Checks on Canadian banks accepted at par.

PRICE Cash With Order **75¢**

CLIMATEMAKER SLIDE RULE COMPANY, Not Inc.
1404 E. Washington St. Bloomington, Ill.

ORNAMENTS

STAMPINGS & SPINNINGS

Zinc Ornaments Available From Stock. Copper, brass, bronze, aluminum and stainless steel ornaments made up promptly.

If you don't have catalog K, send for it NOW.

MILLER & DOING

89 ADAMS STREET BROOKLYN, N. Y.

Statement of Ownership and Management of

AMERICAN ARTISAN

for October 1, 1950

The following is a statement of ownership, management, etc., as required by the act of Congress of August 24, 1912, as amended by the acts of March 3, 1933 and July 2, 1946 (Title 39, United States Code, Section 233) of American Artisan, published monthly at Chicago, Ill., for October 1, 1950.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, F. P. Keeney, Chicago, Illinois.
Editor, John E. Peterson, Chicago, Illinois.
Managing Editor, John E. Peterson, Chicago, Illinois.
Business Manager, Chas. E. Price, Chicago, Illinois.

2. The owner (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Keeney Publishing Company, 6 North Michigan Avenue, Chicago 2, Illinois. Stockholders: F. P. Keeney, Chicago, Illinois; R. J. Osborn, Fairfield, Conn.; Chas. E. Price, Chicago, Illinois; Robert A. Jack, Cleveland Heights, Ohio.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

F. P. Keeney, Publisher.

Sworn to and subscribed before me this 24th day of September, 1950.
Grace E. Wynne

(My commission expires February 10, 1954)

(SEAL)

MILTON
SHEET METAL MACHINERY SPECIALISTS

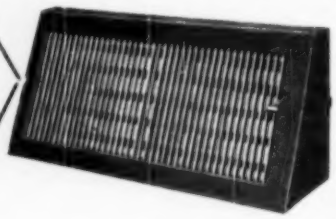
DO YOU HAVE PROBLEMS ? ? ?
We Can Help You Solve Them By Furnishing The Proper Machines.
We Carry A Complete Stock of New & Used Hand & Power Machines.
We Stock Punches & Dies & Adapters For All Presses & Brakes, Shear Blades & Spot Welder Tips & Hand Tools

MILTON EQUIPMENT CO.

N.E. Cor. 4th & Race Phila. 6, Pa.

ROCK ISLAND

OUT-O-WALL REGISTERS AND INTAKES



Available in standard sizes; also in narrow floor projections for second floor stacks; also Forced Air Sizes. Especially adapted to remodeling work and for places with double joists, sills or masonry walls where you cannot cut in the ordinary baseboard register. You save 90% on labor and improve your job when you use Out-O-Wall registers and Intakes.

Write today for a copy of our complete catalogue giving full information on our extensive line of Registers and Ventilating Grilles.

ROCK ISLAND REGISTER CO.

2435 FIFTH AVENUE ROCK ISLAND, ILLINOIS

d) establishments substantially affecting national defense.

Most important phase of the standards listed will be the dollar volume test. This test places a business outside the local area or category if its annual volume of business equals or exceeds any of the following:

a) $25,000 in interstate sales.
b) $50,000 in sales to public utilities, transit systems, instrumentalities and channels of interstate or foreign commerce or customers who make, individually, at least $25,000 of interstate sales.
c) $500,000 of direct interstate purchases.
d) $1,000,000 in indirect interstate purchases.
e) any combination of the above-described sales or purchases, provided the percentages of their dollar value to the appropriate minimum figures totals at least 100.

This dollar volume test places considerably more importance on interstate sales than on interstate purchases. The size of the minimum figure for interstate purchases will rule out many rather large businesses.

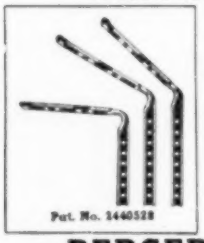
One principal effect of the dollar volume test set up by the board will be to place most of the construction industry outside its jurisdiction. By its very nature, building construction is primarily an intrastate operation. Add to that the fact that many companies engaged in residential construction do not make $500,000 in direct purchases or $1,000,000 in indirect purchases of interstate supplies.

Chicago Steel Bending Brake

STANDARD HAND BRAKE
ONE MAN OPERATION

DREIS & KRUMP MANUFACTURING CO.
7404 LOOMIS BLVD. · CHICAGO 36, ILL

IMPROVED!

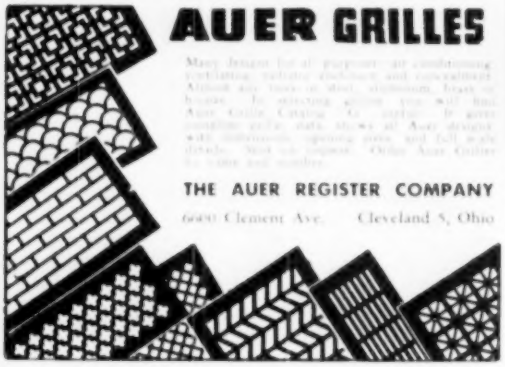


• B B •
No. 12 SHANK
33⅓% STRONGER

IMPROVEMENT IS APPLIED TO No. 15—SQUARE, No. 19—¼ PITCH, AND No. 25—¼ PITCH.

SOLD THRU LEADING JOBBERS EVERYWHERE

BERGER BROS. CO.
Main Office & Factory
229-237 Arch St. Philadelphia, Pa.



AUER GRILLES

Many designs for all purposes: air conditioning, ventilating, radiator enclosures and concealment. Although any design is made of aluminum, brass or bronze, by ordering from the "Auer" line, Auer Grille Catalog, you receive a grille assembled with frame, shown at Auer design with mahogany opening rails and full scale details. Not an expense. Order Auer Grilles to color and number.

THE AUER REGISTER COMPANY
6600 Clement Ave. Cleveland 5, Ohio

BREMIL
The IMPROVED Compound Lever Shears

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet

BREMIL MANUFACTURING CO.
1800 Pittsburgh Avenue ERIE, PA.

HEAT THAT COLD ROOM

This self-cooled booster fan will do the job better because it's ventilated. Oil only twice a year without removing the fan from warm air pipe. Long lasting, quiet, efficient, runs on house current, weighs only 15½ lbs. Fits pipe sizes from 8" to 12", very simple to install. Can be operated with switch, automatic fan control or thermostat. Thousands now in use. Ask your jobber today or write us for prices. Insist on McLarty, the only ventilated booster fan on the market.

McLARTY SYSTEMS 201 W. Mich. Ave. Battle Creek, Mich.

New centrifugal fan ventilator—

Swartwout **Airlift**

with certified fan ratings

Investigate this completely engineered roof ventilator for efficient *quiet* duct exhaust against static pressure. Write for Bulletin 341.

The Swartwout Company
18511 Euclid Avenue
Cleveland 12, Ohio

Copper - Brass - Bronze
Perforated
TO YOUR REQUIREMENTS

PERFORATED METALS
FOR ALL INDUSTRIAL USES
ARCHITECTURAL GRILLES
SEND FOR CATALOG #35

DIAMOND MFG. CO.
BOX 34 WYOMING, PA.

MOREY FLOAT VALVES

Made Right Priced Right

List Price 1.50

Packed in Dozen Lots

Morey Valves close against pressure. Each operation washes neoprene seat. ⅜" pipe thread outside, ⅛" inside. Brass body 2½" x3" copper float or 4"x5" seal float. The ideal float valve for evaporative coolers, poultry feeders, small cooling towers and evaporative condensers.

2000% increase in Morey Valves in Tucson in 1950.

Write for trade discount on

The Morey line of Recirculating Pumps, Cooler Pads, Float Valves, Special Woven Netting and Aspen Excelsior.

DAN MOREY 814 S. Robertson Blvd. Los Angeles 35, California

SODER ALUMINUM
STRONG JOINTS
Samples Free

ALLEN — AT IT SINCE '02

FLUXES

SODERING
BRAZING & WELDING

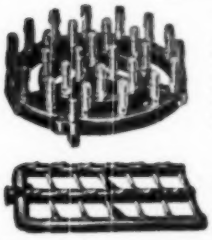
L. B. ALLEN CO. INC. Chicago 31, Ill.

6702 W. Bryn Mawr Avenue

EYES LEFT!
TO Page 17

BARBER BURNERS

For All Gas Appliances



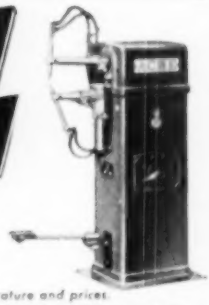
We have the facilities and experience for designing and building the exact type and size of burner unit to fit any gas appliance, using natural, manufactured, Butane or bottled gas. We cooperate with any reliable manufacturer in the necessary development and laboratory testing and in acting as continuous source of supply for his burner units.

Latest Catalog on request

The Barber Gas Burner Co.
3704 Superior Ave., Cleveland, Ohio

SPOT WELD

WITH ACME "HOT SPOT" WELDERS



● Years of care-free service in thousands of sheet metal fabricating plants throughout the world.

LIFETIME GUARANTEE!

Complete range of sizes. Write for literature and prices.

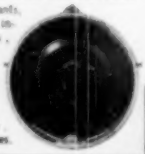
ACME ELECTRIC WELDER CO.
2618-B Fruitland Road Los Angeles 11, Calif.

WALKER TYPE 34

For any type of domestic furnace in homes, stores, small office buildings and apartments. Sizes 6-20 inches. Shown with installation collar.

COMMERICAL and INDUSTRIAL

For power plants, schools, garages, industrial plants, laundries and other commercial uses. Built to meet most severe conditions. Ball bearing. Sizes 16-36 inches.



Help Your Customers

SAVE UP TO 25% ON FUEL!

Now you can offer savings up to 25% on ALL types of fuel — coal, gas, oil — with the new, improved Walker Draft Regulators. Assure maximum, economical combustion under ALL stack conditions. Quickly installed. Easily adjusted. Guaranteed.

Over 7 million in use!

Sell this fast turning, profit-line of draft regulators. Walker quality makes customers. See your jobber or write WALKER MFG. & SALES CORP., 1701 Penn St., St. Joseph, Mo. Dept. 402.

WALKER Automatic DRAFT REGULATORS

Any Time is Furnace Cleaning Time

Winter furnace cleaning is profitable because it is urgent.
With a Super Red Streak you can clean neglected heating plants hot or cold without discomfort to the household.
On chimneys you work safely from the basement. Chimney cleaning tools are standard Red Streak Equipment.
Our FREE SUPER Sales Plan Book tells you how to promote a successful furnace cleaning business. Ask your supply dealer or write for our 5 day free trial offer. Try a Red Streak for 5 days. Keep what you make.

National Super Service Company, Inc.
1944 N. 13th Street, Toledo 2, Ohio

SUPER SUCTION

SINCE 1911

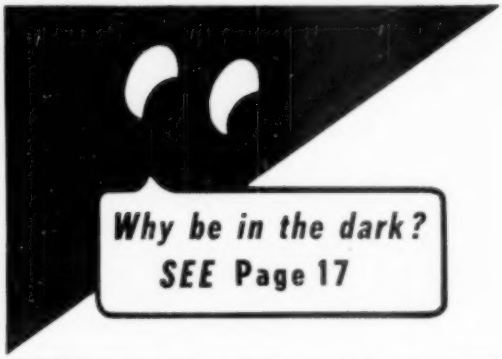
"THE DRAFT HORSE OF POWER SUCTION CLEANERS"

Need a Chimney?

VAN-PACKER PACKAGED CHIMNEY

- ADDITIONAL PROFITS FOR YOU from both sale and installation.
- YOU QUOTE a COMPLETE JOB — heating unit, ducts, and VAN-PACKER CHIMNEY.
- MORE BUSINESS — thru more heating jobs by quoting a completely packaged job — heating plant — ducts — chimney.
- YOU CAN QUOTE LOWER OVER-ALL prices because of lower cost chimney.
- APPROVED — The only light-weight masonry chimney approved by Underwriters' for [illegible] any fuel. Can be used with any type heating installation, fully meets FHA requirements.

VAN-PACKER CORPORATION
124 W. Adams St., Chicago 3, Ill.

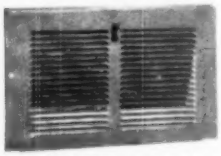


YOU'LL SAVE TIME and MONEY BY MAKING USE OF

CLASSIFIED ADVERTISING

Classified Section: Rates for classified advertising are 10 cents for each word, including heading and address. One inch $5.00. Count nine words for keyed address. Minimum $2.00 for each insertion. Cash must accompany order.

NEW! IMPROVED! REGISTERS



Quality at your price! Refinements in manufacturing have made it possible to turn out this **quality** register—**heavy gauge** steel, snug closure, easy movement, standard sizes, etc. — at an amazingly low cost. Investigate Krauser-Boyd's quality . . . profit by their low prices.

KRAUSER-BOYD, Inc.
NORTH TONAWANDA, N. Y.

for sale

FOR SALE—Have overstocked on the following items. Will close out at 75% discount below your current cost. Lennox Prefab dust fittings. Boots and transitions. Welding Rods. Cutting tools of all types. Heating, Stoker and Refrigeration. Nuts, bolts, and shields. Tinned rivets. Miscellaneous Sheet Metal Tools. Write for quotations. Address Kuth Brothers, Inc., Savannah, Georgia.

Complete heating plant. 1 No. 7 American Radiator RED TOP furnace. 1 Will-Burt Air Control Stoker. 80 gal. hot water tank. 14 radiators, from 20" to 30" height, min. fittings. Good condition. Located at Rock Hill Tourist Court, Hopkinsville, Ky. Write Hopkinsville or Vernon Gatz, 2040 W. Madison St., Chicago 12, Ill.

wanted

WANTED: Shearings are amount — all sizes Galvanized, cold and hot rolled aluminum, Stainless and copper 6" minimum width 50" minimum length, uniform quantities. Gauges from 16 to 30 inclusive.

Write or wire

Los Angeles Sheet Metal Mfg. Co.
930-904 East 9th Street, Los Angeles 21, Calif.
Trinity 4715

for sale

For Sale: 800,000 yards cheese cloth. Widths —36 to 48 inches. Dan Mercy, 814 S. Robertson Blvd., Los Angeles 35, Calif.

HEAVY DUTY POWERFUL FURNACE VACUUM CLEANER (no bags needed) only $89.50. Rush check with order. Fully guaranteed. Write for special low prices on oil and gas burners. Hasko Utilities Company, 879 Tenth Ave., New York 19, N. Y.

INVEST IN YOUR FUTURE — START BUYING DEFENSE BONDS

American Artisan

SERVICE SECTION

Rates for display space in the Service Section are $8.50 per inch per insertion. One-inch minimum space accepted.

IMMEDIATE DELIVERY WHILE THEY LAST!

No. 5036 PARKER MULTI-MAX DOUBLE CRANK PRESSES
Life type, 30 ton, 2" str. 10" shut height, 12x37" bed, M.D. (11)

PRESS BRAKES

No. 2062 VERSON: 78" 14 ga. cap., 62" bet. (2).
No. 2050 VERSON: 65" 14 ga. cap., 50" bet. (2).
No. 1062 VERSON: 52" 14 ga. cap., 62" bet., 78" bed and ram. (4)
DREIS & KRUMP: 8' bet. 8' bed & ram.
No. 126 DREIS & KRUMP: 52 1/2" length of bed and ram. AC M.D.
DREIS & KRUMP: Wide bed, 5' 10 ga.
10' x 1/4" cap. UNIVERSAL Hydraulic
10' x 3/16" cap. D. & K. Whistler Die Set.

POWER SQUARE SHEARS

No. 748 NIAGARA: 4' 3/16" cap.
6' 14 ga. PARKER ALLSTEEL.
6' 14 ga. WYSONG AND MILES.
8' 10 ga. OHL.

New and used welders in stock — all sizes. Write us your requirements.

OVER 2,000 MACHINES IN STOCK
Our Blue Book Lists and Illustrates All Types Of Metal Working Equipment
SEND FOR YOUR FREE COPY TODAY
EASTERN DIVISION OFFICE 2829 N. Broad St. PHILADELPHIA 32, PA.

INTERSTATE *Machinery Co., Inc.* PHONE [illegible] 1633 W. PERSHING RD., CHICAGO 9, ILL.

THOR UNIVERSAL CLIP PUNCH
$35.00
F.O.B. Oakland, Calif.

Weight 7 lbs.

CAPACITY: 3 sheets of 20 ga. mild steel. This tool will punch, flatten out the ear and solidly squeeze the metal together as if riveted. No need for hammer and dolly. A fast, efficient tool for fastening government locks and standing seams in all kinds of sheet metal work.

THOR bench model hand-operated GOVERNMENT CLIP DIES
Model No. 100, $85.00
Model No. 200, $160.00

See your local dealer or write for literature and samples of metal sheared in above tools.

THOR TOOL AND DIE CO.
3444 MORRISON AVE.
OAKLAND 2, CALIF.

IT'S CHIMNEY TOP TIME AGAIN

For Better Chimney Draft And Improved Stack Performance Use.

ACCURATE REVOLVING VENTILATORS

Positively Prevents Downdraft — Storm And Rainproof — Simple in Design — Durable in Construction

STOCKED BY YOUR JOBBER
SEND FOR LITERATURE TODAY

ACCURATE SHEET METAL & MFG. WORKS
2336 Milwaukee Ave. — CHICAGO 47, ILL.

Use This Section For Quick Results

GRAND RAPIDS FURNACE CLEANERS

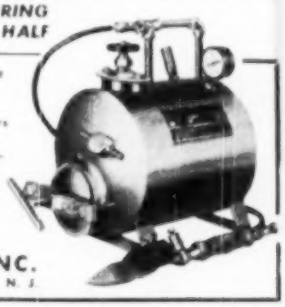
Write for Details
DOYLE VACUUM CLEANER CO.
227 Stevens St., S.W.
Grand Rapids 7, Mich.

Quick Set Dividers

Fastest and most accurate on the market. Two sizes for circles up to 36" and 48". Guaranteed. Order now.

CUT SOLDERING COSTS IN HALF

Will give you hot soldering iron in one minute— Solders eight hours for 10c—Right amount of heat— No changing of irons—Make your own fuel from water and carbide.



REINER & CAMPBELL CO., INC.
19 EUCLID AVENUE NEWARK 5, N. J.

METAL ELBOWS

Galvanized - Black - Tin and Welder - Adjustable Elbows Machine Riveted
Quick Deliveries

Juniper Elbow Co., Inc.
72-15 Metropolitan Ave.
Middle Village, L. I., N. Y.

SHEET METAL MACHINES & TOOLS

Lockformer Pittsburgh Machines
Lockformer Cleat Machines
Chicago Hand Brakes
Chicago Press Brakes
Pexto Power Shears
Pexto Foot Shears
Pexto Rotary Machines
Pexto Slip Rolls
Pexto Bar Folders
Smith Cleat Benders
Rex Spot Welders
Reed Power Rolls
Whitney Punches
Whitney Foot Presses
Whitney Mechanic's Tools
Pexto Mechanic's Tools
Van Dorn Electric Tools
Marshalltown Shears

When in Chicago, visit our Machinery Showroom

COMPLETE LINE OF SHEET METAL & VENTILATING SUPPLIES

CENTRAL-WEST MACHINERY CO.

335 SO. WESTERN AVE HAYMARKET 1-8360 CHICAGO 12, ILL.

How to drill concrete

for expansion anchors . .

You can drill holes thru concrete walls, floors, ceilings, 12 to 15 times faster than by hand. Use the Wodack DO ALL Electric Hammer. Typical example: drills a 3/8" hole 1" deep thru average concrete in less than 15 seconds! Saves time and money. You also use Wodack DO ALL for chiseling concrete, drilling wood, metal, etc. Investigate.

WRITE TODAY FOR BULLETIN 472-AA

Wodack Electric Tool Corporation
4427 W. Huron St., Chicago 44, Ill.

INDEX TO ADVERTISERS

A & A Register Co., The 136
Acme Electric Welder Co. 149
Acme Equipment Co., Inc. *
Adams Co., The 146
Aerofin Corp. *
Air Conditioning Products Co. 140
Air Controls, Inc. *
Air Control Prod., Inc. Inside Front Cover
Airfan Engrg. Co. 147
Airtemp Div. of Chrysler Corp. *
Airtherm Mfg. Co. *
A-J Mfg. Co. *
Ajax Furnace Fitting Co. *
Allen Co., Inc., L. B. 149
Alton Mfg. Co. *
Aluminum Co. of America 115
American Air Filter Co., The 20
American Brass Co. *
American Gas Machine Co. *
American Machine Products *
American Radiator & Standard Sanitary Corp. *
American Steel & Wire Co. 39 & 113
Anchor Div., Stratton & Terstegge Co. 139
Anchor Post Products, Inc. *
Anemostat Corp. of America *
Anthracite Institute *
Armco Steel Corp. 35
Armstrong Co., The *
Armstrong Furnace Co. 29
Atlas Mfg. Co. *
Auer Register Co. 47 & 148
Automatic Burner Corp. *
Automatic Humidifier Co. 33
Automatic Products Co. 30

Bacharach Industrial Instrument Co. *
Barber Colman Co. 12
Barber Gas Burner Co., The 149
Bauer & Black, Div. Kendall Co. *
Bayley Blower Co. *
Berger Bros. Co. 148
Berger Mfg. Co., Div. of Republic Steel Corp. 25
Bethlehem Steel Co. *
Beverly Shear Co. 136
Bishop & Babcock Mfg. Co., Inc. *
Boston Machine Works Co. *
Breuer Supply Mfg. Co., A. G. 146
Bremil Mfg. Co. 148
Breuer Electric Mfg. Co. *
Bristol Metal Working Equip. *
Brundage Co. *
Bryant Heater *
Buffalo Forge Co. *
Burgess Thomas Company *

Calculator Specialties Co. *
Carnegie-Illinois Steel Co. 39 & 113
Central-West Machinery Co., Inc. 151
Century Engineering Corp. *
Certified Furnace Co. 135
Champion Furnace Pipe Co. *
Char-Gale Mfg. Co. 45
Chase Brass & Copper Co. *
Chevrolet Motor Div., General Motors Corp. 43
Cincinnati Elbow Co., The 137
Clarage Fan Co. *
Clayton & Lambert Mfg. Co. 114
Clean Sweep Co., The *
Cleveland Humidifier Co. 137
Climatemaker Slide Rule Service 147
Cole-Sewell Engrg. Co. *
Coleman Co., Inc., The *
Columbia Steel Co. 39 & 113
Combustioneer Div., The Steel Products Engrg. Co. *
Comfort Products Corp. *
Conco Engineering Works *
Condensation Engineering Corp. *
Corlett-Turner Co. *
Corsaire Heater Co., The 143
Cutta Transmission Corp. *
Crescent Tool Co. 84
Crise Controls Div., Acme Mfg. Co. *

Dahlstrom Machine Works *
Delco Appliance Div., General Motors Corp. *
Delco Products Div., General Motors Corp. *
Des Moines Furnace & Stove Repair Co. 137
Detroit Air Filter Co. *
Detroit Lubricator Co. *
Diamond Mfg. Co. 149
Dole Valve Co. *
Doyle Vacuum Cleaner Co. 139
Draco Corp. *
Dreis & Krump Mfg. Co. 148

Electrol Burner Mfg. Co., Inc. *
Elgo Shutter & Mfg. Co. *
Emerson Elec. Mfg. Co. *
Enderle Inc., Ltd., Frank X. 146
Easick Mfg. Co. *
Exposition, 10th Air Conditioning 134

Fairbanks Morse & Co. *
Fallsington Mfg. Co. *
Farrellop Co. *
Fayette Manufacturing Co. *
Federated Metals Division *
Field Control Div., H. D. Conkey & Co. 11
Flagler Mfg. Co., Roy G. *
Follansbee Steel Corp. 131
Forest City Foundries Co., Inc. *
Franck & Fric 137

Gallaher Co. *
Galvan Mfg. Co. *
General Electric Co. 132
General Filters, Inc. *
Gerett Corp., M. A. 141
Gilbert & Barker Mfg. Co. *
Glasby Mfg. Co., Inc., J. F. *
Gray and Dudley Co. *
Gray Metal Products, Inc. 125
Gross-Aire Mfg. Co., Inc. *

Hall-Neal Furnace Co. 18
Harrington & King Perforating Co. 139
Hart & Cooley Mfg. Co. 16
Harvey, Inc., Sid *
Heil Company *
Henderson Furnace & Mfg. Co. *
Henry Furnace Co., The 21
Hess Co., The *
Hess-Snyder Co. 138
Hussey & Co., C. G. 19

Illinois Testing Laboratories, Inc. 118
Independent Pneumatic Tool Co. *
Independent Register Co. 10
Inland Steel Products Co. *
Interstate Machinery Co., Inc. 151
International Nickel Co., The 48
International Oil Burner Co. *

Jackson & Church Co. *
Johns-Manville Corp. 129
Johnson Co., S. T. *
Johnson Gas Appliance Co. *
Juniper Elbow Co., Inc. *

Kaiser Aluminum & Chemical Corp. *
Kalamazoo Stove & Furnace Co., The 40 & 41
Kent Company, Inc., The *
Kirk & Blum Mfg. Co. *
Ko-Z-Aire, Inc. *
Krauser-Boyd, Inc. 150
Kresno-Stamm Mfg. Co. (America) Inc. *
Krueger Sentry Gauge Co. 5

Lau Blower Co. *
Levow, David *
Lima Register Company 37
Lockformer Co. 9

M-M-A, Inc. *
Made-Rite Co., Inc. 140
Maid-O'-Mist, Inc. 28
Maplewood Machinery Co. 146
Marshalltown Mfg. Co. 139
Master Products Co. *
May-Fiebeger Co. 141
Mayflower Air Conditioners, Inc. *
McLarty Systems 149
Mel-Gauge Co. *
Merrond Corp., The *
Meyer & Bro. Co., F. *
Meyer Furnace Co. 17, 147, 149 & 150
Midco Register Corp. 141
Mid-Continent Metal Products Co. *
Mid-States Welder Mfg. Co. *
Miller & Doing 141
Milton Equipment Co. 147
Minneapolis-Honeywell Regulator Co. 7
Mirey, Dan 149
Morrison Products, Inc. 26
Morrison Steel Products, Inc. *
Mueller Furnace Co., L. J. 117

National Engr. & Mfg. Co. *
National Heater Co. *
National Lock Company 122
National Metal Fabricators 141
National Super Service Co. 150
Niagara Machine & Tool Works 27
Norge Heat Div., Borg Warner Corp. *
Norman Products Co. *
Nu-Way Corp. *

Obdyke, Inc., Benjamin P. *
Ohio Valley Hardware & Roofing Co. *
Oilux Co. *
Olsen Mfg. Co., C. A. 15
Olson & Company, Arthur A. 133
OverHead Heaters, Inc. *
Owens-Corning Fiberglas Corp. 23

Packard Elec. Div. General Motors Corp. 119
Palmer Mfg. Co. *
Parker Kalon Corp. 34 & 124
Patten Co., J. V. 8
Peck, Stow & Wilcox Co. *
Peerless Foundry Co. 141
Penn Electric Switch Co. 1
Penn Ventilating Co. 141
Perfection Stove Co. *
Perfex Corp. 14
Petersen Mfg. Co. 145
Philadelphia Rust-Proof Co. 143
Pioneer Furnace Co. *
Pioneer Tool Co. *
Premier Furnace Co. *

Quiet Automatic Burner Corp. *

R C S Tool Sales Corp. 128
Randall Graphite Bearings, Inc. 127
Reiner & Campbell Co., Inc. 151
Reinhard Bros. Co. *
Republic Steel Corp. Inside Front Cover
Research Products Corp. 36
Revere Copper & Brass, Inc. 101
Reynolds Metals Co. *
Rheem Mfg. Co. 31
Richmond Radiator Co. 53
Rochester Mfg. Co., Inc. *
Rock Island Register Co. 148
Royal Heaters, Inc. 129
Russell, Burdsall & Ward Bolt and Nut Co. 24
Rybolt Heater Co. 126
Ryerson & Son, Inc., Joseph T. 54

Sall Mountain Co. 120
San Angelo Fdry. & Machine Co. *
Schaefer Brush Mfg. Co. 123
Scully Signal Co. *
Security Mfg. Co. 150
Servel, Inc. *
Severson Mfg. & Supply Co. *
Siemon & Co. 143
Skilsaw, Inc. *
Skuttle Mfg. Co. *
Smith, R. E. *
Standard Stamping & Perforating Co. 142
Stelco Steel Co. *
Stewart-Warner *
Sturtevant Co., B. F., Div. of Westinghouse Elec. *
Sundstrand Engrg. Co.
Sundstrand Hydraulic Div., Sundstrand Machine Tool Co. 42
Sun-Ray Burner Mfg. Co. 127
Superior Products Co. *
Surface Combustion Corp. *
Swartwout Co. 149
Syncromatic Corp. 5

Tennessee Coal, Iron & R. R. Co. 39 & 113
Thatcher Furnace Co. *
Thermac Company 116
Thor Metal Prod. Co. *
Thor Tool & Die Co. 151
Toridheat Div., Cleveland Steel Products Corp. *
Triangle Mfg. Co. 145
Trindl Products, Ltd. *
Tri-Saw Corporation 144
Turb-O-Tube Furnace, Inc. *
Turner Brass Works, The *
Tuttle & Bailey, Inc. 32

Union Mfg. Co. *
United States Air Conditioning Co. *
U. S. Machine Corp. 13
United States Register Co. 44
United States Steel Corp. }
United States Steel Export Co. } 39 & 113
United States Steel Supply Co. }
Uno Ventilator Co. *

Van Dorn Electric Tool Co., The 131
Van Packer Corp. 150
Viking Air Conditioning Corp. 22
Viking Mfg. Corp., The *
Vyke Brake Co. *

Walker Mfg. & Sales Corp. 150
Wallace Co., William 46
Ward Machinery Co. *
Waterman-Waterbury Co. 70
Wayne Home Equipment Co., Inc. *
Webster Elec. Co. *
Western Engrg. Co. 142
Wheeling Corrugating Co. *
White Mfg. Co. 131
White-Rodgers Elec. Co. Outside Back Cover
Whitney Mfg. Co., W. A. 141
Whitney Metal Tool Co. 138
Williams Oil-O-Matic Division Eureka Williams Corp. *
Williamson Heater Co. *
Wilson & Co., Inc. *
Wilson, Inc., Grant *
Wise Furnace Co. *
Wiss & Sons Co., J. *
Wodack Electric Tool Co. 151
Wolff & Co., Benjamin Inside Back Cover
Wysong & Miles Co. 38

Youngstown Furnace Co. 144

Zink Co., John 121

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.

When you're shopping around— open your eyes to

Wolff Red Seal Expanded Metal

Sheets, available now, that you can use to your advantage

Only a few alert people have thought much about how to use expanded metal. Those who have applied this versatile product to their jobs know it as a strong flat sheet, light in weight, readily formed, low in cost and available in a wide range of mesh sizes and weights.

With so many properties for the good, plus immediate delivery, you owe it to yourself to think how and when you can adapt it — particularly Wolff Red Seal Expanded Metal, the best in the business. You'll find Wolff sheets as you want them — clean-cut, flat-lying and free from burrs and protrusions.

Call or write for full information and a bulletin of ideas on where you can put expanded metal to work for you.

BENJAMIN WOLFF & COMPANY
PRIME METAL SERVICE
CHICAGO

Carbon Steels, Stainless Steels, Aluminum, Copper, Tinplate, Metal Decorating

BENJAMIN WOLFF AND COMPANY

General Office and Warehouse — 5800 South Seeley Ave., Chicago 36, Ill.
Wisconsin Office — 176 W. Wisconsin Ave., Milwaukee 3, Wis.

White-Rodgers
DIAPHRAGM GAS VALVES
WHITE-RODGERS
Controls
FOR REFRIGERATION
HEATING AND
AIR CONDITIONING
ST. LOUIS 6, MO.
Branches:
NEW YORK
52 Vanderbilt Ave.
CLEVELAND
5005 Euclid Ave.
CHICAGO
800 W. North Ave.
Resident Sales Engineers in all Principal Cities